



SPORTON LAB.



Certificate No: EC7N1603

CERTIFICATE

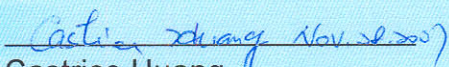
● **EQUIPMENT : HDSDI BOARD**
MODEL NO. : L007KK
TRADE NAME : NEC
APPLICANT : NPG Display Ltd. Taiwan Branch
Fl. 2, No. 8, Tun Hwa N. Rd., Sungshan District,
105 Taipei, Taiwan, R.O.C.



I HEREBY

CERTIFY THAT:

THE MEASUREMENTS SHOWN IN THIS TEST REPORT WERE MADE IN ACCORDANCE WITH THE PROCEDURES GIVEN IN **EUROPEAN COUNCIL DIRECTIVE 2004/108/EC**. THE EQUIPMENT WAS **PASSED** THE TEST PERFORMED ACCORDING TO **European Standard EN 55022:2006 Class A, EN 61000-3-2:2000, EN 61000-3-3:1995/A1:2001 and EN 55024:1998/A1:2001/A2:2003 (IEC 61000-4-2:1995/A2:2000, IEC 61000-4-3:2002, IEC 61000-4-4:1995/A2:2001, IEC 61000-4-5:1995/A1:2000, IEC 61000-4-6:1996/A1:2000, IEC 61000-4-8:1993/A1:2000, IEC 61000-4-11:1994/A1:2000)**. THE TEST WAS CARRIED OUT ON **Nov. 21, 2007** AT **SPORTON INTERNATIONAL INC. LAB.**


Castries Huang
Supervisor

CE EMC TEST REPORT

according to

**European Standard EN 55022:2006 Class A,
EN 61000-3-2:2000, EN 61000-3-3:1995/A1:2001 and
EN 55024:1998/A1:2001/A2:2003 (IEC 61000-4-2:1995/A2:2000,
IEC 61000-4-3:2002, IEC 61000-4-4:1995/A2:2001,
IEC 61000-4-5:1995/A1:2000, IEC 61000-4-6:1996/A1:2000,
IEC 61000-4-8:1993/A1:2000, IEC 61000-4-11:1994/A1:2000)**

Equipment : HDSDI BOARD

Model No. : L007KK

Trade Name : NEC

Applicant : **NPG Display Ltd. Taiwan Branch**
Fl. 2, No. 8, Tun Hwa N. Rd., Sungshan District,
105 Taipei, Taiwan, R.O.C.

- The test result refers exclusively to the test presented test model / sample.
- Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.
- This test report is only applicable to European Community.

SPORTON International Inc.

6F, No. 106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

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History of this test report

Original Report Issue Date: Nov. 28, 2007

- ☒ No additional attachment.
☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description



CERTIFICATE OF COMPLIANCE

according to

European Standard EN 55022:2006 Class A,
EN 61000-3-2:2000, EN 61000-3-3:1995/A1:2001 and
EN 55024:1998/A1:2001/A2:2003 (IEC 61000-4-2:1995/A2:2000,
IEC 61000-4-3:2002, IEC 61000-4-4:1995/A2:2001,
IEC 61000-4-5:1995/A1:2000, IEC 61000-4-6:1996/A1:2000,
IEC 61000-4-8:1993/A1:2000, IEC 61000-4-11:1994/A1:2000)

Equipment : HDSDI BOARD

Model No. : L007KK

Trade Name : NEC

Applicant : **NPG Display Ltd. Taiwan Branch**
Fl. 2, No. 8, Tun Hwa N. Rd., Sungshan District,
105 Taipei, Taiwan, R.O.C.

I **HEREBY** CERTIFY THAT:

The measurements shown in this test report were made in accordance with the procedures given in **EUROPEAN COUNCIL DIRECTIVE 2004/108/EC**. The equipment was **passed** the test performed according to **European Standard EN 55022:2006 Class A, EN 61000-3-2:2000, EN 61000-3-3:1995/A1:2001 and EN 55024:1998/A1:2001/A2:2003 (IEC 61000-4-2:1995/A2:2000, IEC 61000-4-3:2002, IEC 61000-4-4:1995/A2:2001, IEC 61000-4-5:1995/A1:2000, IEC 61000-4-6:1996/A1:2000, IEC 61000-4-8:1993/A1:2000, IEC 61000-4-11:1994/A1:2000)**. The test was carried out on Nov. 21, 2007 at **SPORTON International Inc. LAB**.


Castries Huang
Supervisor

SPORTON International Inc.

6F, No. 106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

1. General Description of Equipment under Test

1.1. Applicant

NPG Display Ltd. Taiwan Branch
Fl. 2, No. 8, Tun Hwa N. Rd., Sungshan District,
105 Taipei, Taiwan, R.O.C.

1.2. Manufacturer

Same as 1.1.

1.3. Basic Description of Equipment under Test

Equipment	: HDSOI BOARD
Model No.	: L007KK
Trade Name	: NEC
BNC Cablex12	: Shielded, 1.8m
BNC Cablex	: Shielded, 10m
HDMI Cable	: Shielded, 1.5m
FiberCable	: Non-Shielded, 1.2m
RJ45 Cable	: Shielded, 1.5m
DVI Cable	: Shielded, 2.0m
D-SUB Cable	: Shielded, 2.0m
Audio Cable	: Non-Shielded, 1.8m
DVI to D-SUB Cable	: Shielded, 0.15m
RS232 Cable	: Shielded, 1.2m
AV Cable	: Shielded, 1.5m
YPbPr Cable	: Shielded, 1.5m
S-Video Cable	: Shielded, 1.5m
Power Supply Type	: Switching
AC Power Cord	: Non-Shielded, 3.0m, 3pin

1.4. Feature of Equipment under Test

- Please refer to user manual.

2. Test Configuration of Equipment under Test

2.1. Test Manner

- a. During testing, the interface cables and equipment positions were varied according to European Standard EN 55022.
- b. The complete test system included remote workstation, HP PC, BTC PS/2 Keyboard, MICROSOFT PS/2 Mouse, EPSON Printer, ACEEX Modem, SONY DVD Player, GALAXY Headset and EUT for EMI test. The remote workstation included Corio2 Powered Video Processor.
- c. The following test modes were pretested for EMI test:
 - Mode 1. DVI, 1920*1080 60Hz
 - Mode 2. D-SUB, 1920*1080 60Hz
 - Mode 3. HDSOI, 1920*1080 60Hz
 - Mode 4. AV
 - Mode 5. S-Video
 - Mode 6. HDMI
 - Mode 7. Y, Pb/Pr
 - Mode 8. HDSOI, 1920*1080 60Hz with Ferrite clamps – for radiation test onlyFor conduction, cause “mode 6” generated the worst test result, it was reported as final data.
For radiation, cause “mode 3” generated the worst test result, it was reported as final data.
- d. The complete test system included remote workstation, DELL PC, DELL PS/2 Keyboard, DELL PS/2 Mouse, KINYO Headset, SONY DVD Player and EUT for EMS test. The remote workstation included Corio2 Powered Video Processor.
- e. The following test modes were pretested for EMS test:
 - Mode 1. PC Mode
 - Mode 2. DVD Play Mode
- f. Frequency range investigated: conduction 150 kHz to 30 MHz, radiation 30 MHz to 1000MHz.

2.2. Description of Test System

< EMI >

Support Unit 1. -- Personal Computer (HP) – for local workstation

FCC ID	: N/A
Model No.	: SGH6500FPX
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0018
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 2. -- PS/2 Keyboard (BTC) – for local workstation

FCC ID : N/A
Model No. : 9110
Serial No. : SP0024
Data Cable : Shielded, 1.7m
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 3. -- PS/2 Mouse (MICROSOFT) – for local workstation

FCC ID : N/A
Model No. : 1004
Serial No. : SP0037
Data Cable : Shielded, 1.8m
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 4. -- Printer (EPSON) – for local workstation

FCC ID : N/A
Model No. : LQ300+
Power Supply Type : Linear
Power Cord : Non-Shielded
Serial No. : SP0048
Data Cable : Shielded, 360 degree via metal backshells, 1.8m
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 5. -- Modem (ACEEX) – for local workstation

FCC ID : IFAXDM1414
Model No. : DM1414
Power Supply Type : Linear
Power Cord : Non-Shielded
Serial No. : SP0055
Data Cable : Shielded, 360 degree via metal backshells, 1.2m

Support Unit 6. -- DVD Player (SONY) – for local workstation

FCC ID : N/A
Model No. : DVP-N590V
Serial No. : SP0067
Data Cable : Non-Shielded, 2.0m

Support Unit 7. -- DVD Player (SONY) – for local workstation

FCC ID : N/A
Model No. : DVP-NS509
Serial No. : SP0067
Data Cable : Non-Shielded, 2.0m

Support Unit 8. -- Headset (GALAXY) – for local workstation

FCC ID : N/A
Model No. : HP-316
Serial No. : SP0067
Data Cable : Non-Shielded, 1.8m

Support Unit 9. – Video Processor (Corio2 Powered) – for remote workstation

FCC ID : N/A
Model No. : C2-7200
Serial No. : SP0067
Data Cable : Shielded, 1.7m

< EMS >**Support Unit 1. -- Personal Computer (DELL) – for local workstation**

FCC ID : N/A
Model No. : DMC
Power Supply Type : Switching
Power Cord : Non-Shielded
Serial No. : SP0016
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 2. – PS/2 Keyboard (DELL) – for local workstation

FCC ID : N/A
Model No. : SK-8110
Serial No. : SP0021
Data Cable : Shielded, 1.9m
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 3. – PS/2 Mouse (DELL) – for local workstation

FCC ID : N/A
Model No. : M-S34
Serial No. : SP0034
Data Cable : Shielded, 1.8m
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 4. -- DVD Player (SONY) – for local workstation

FCC ID : N/A
Model No. : DVP-NS50P
Serial No. : SP0062
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 5. -- DVD Player (SONY) – for local workstation

FCC ID : N/A
Model No. : DVP-90V
Serial No. : SP0062
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 6. -- Headset (KINYO) – for local workstation

FCC ID : N/A
Model No. : EM3100
Serial No. : SP0067
Data Cable : Non-Shielded, 1.2m

Support Unit 7. – Video Processor (Corio2 Powered) – for remote workstation

FCC ID : N/A
Model No. : C2-7200
Serial No. : SP0067
Data Cable : Shielded, 1.7m



3. Test Software

< EMI >

An executive program, EMCTEST.EXE under WIN XP, which generates a complete line of continuously repeating " H " pattern was used as the test software.

The program was executed as follows :

- a. Turn on the power of all equipment.
- b. The PC reads the test program from the hard disk drive and runs it.
- c. The PC sends " H " messages to the monitor, and the monitor displays " H " patterns on the screen.
- d. The PC sends " H " messages to the printer, then the printer prints them on the paper.
- e. The PC sends " H " messages to the modem.
- f. The PC sends " H " messages to the internal Hard Disk, and the Hard Disk reads and writes the message.
- g. Repeat the steps from c to f.

At the same time, " Media player " was executed to play audio.

< EMS >

An executive program, WINFCC.EXE under WIN XP, which generates a complete line of continuously repeating " H " pattern was used as the test software.

The program was executed as follows :

- a. Turn on the power of all equipment.
- b. The PC reads the test program from the hard disk drive and runs it.
- c. The PC sends " H " messages to the monitor, and the monitor displays " H " patterns on the screen.
- d. The PC sends " H " messages to the internal Hard Disk, and the Hard Disk reads and writes the message.
- e. Repeat the steps from c to d.

At the same time, the following programs were executed:

- Executed " Media player " to play audio.
- Executed "DVD Program" to play audio and video.

4. General Information of Test

4.1. Test Facility

<EMI>

Test Site Location : No. 52, Hwa Ya 1St Road, Hwa Ya Technology Park,
Kwei-Shan Hsiang, TaoYuan Hsien, Taiwan, R.O.C.
TEL : 886-3-327-3456
FAX : 886-3-318-0055

Test Site No. : CO01-HY, 10CH01-HY

<EMS>

Test Site Location : No. 52, Hwa Ya 1St Road, Hwa Ya Technology Park,
Kwei-Shan Hsiang, TaoYuan Hsien, Taiwan, R.O.C.
TEL : 886-3-327-3456
FAX : 886-3-318-0055

4.2. Test Voltage

230V / 50Hz

4.3. Standard for Methods of Measurement

EMI Test (conduction and radiation) : European Standard EN 55022 Class A
Harmonics Test : European Standard EN 61000-3-2.
Voltage Fluctuations Test : European Standard EN 61000-3-3.
EMS Test : European Standard EN 55024.
(ESD: IEC 61000-4-2, RS: IEC 61000-4-3, EFT: IEC 61000-4-4, SURGE: IEC 61000-4-5,
CS: IEC 61000-4-6, Power Frequency Magnetic Field: IEC 61000-4-8, DIPS: IEC 61000-4-11)

The test configuration, test modes and test software used in this test report are designated by the applicant.

4.4. Test in Compliance with

EMI Test (conduction and radiation) : European Standard EN 55022 Class A
Harmonics Test : European Standard EN 61000-3-2.
Voltage Fluctuations Test : European Standard EN 61000-3-3.
EMS Test : European Standard EN 55024.
(ESD: IEC 61000-4-2, RS: IEC 61000-4-3, EFT: IEC 61000-4-4, SURGE: IEC 61000-4-5,
CS: IEC 61000-4-6, Power Frequency Magnetic Field: IEC 61000-4-8, DIPS: IEC 61000-4-11)

4.5. Frequency Range Investigated

- Conducted emission test: from 150 kHz to 30 MHz
- Radiated emission test: from 30 MHz to 1,000 MHz
- Radio frequency electromagnetic field immunity test: 80-1000 MHz.

4.6. Test Distance

- The test distance of radiated emission test from antenna to EUT is 10 M.
- The test distance of radio frequency electromagnetic field immunity test from antenna to EUT is 3 M.

5. Test of Conducted Powerline

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 kHz and return leads of the EUT according to the methods defined in European Standard EN 55022 Clause 9. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 5.3. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position producing maximum conducted emissions.

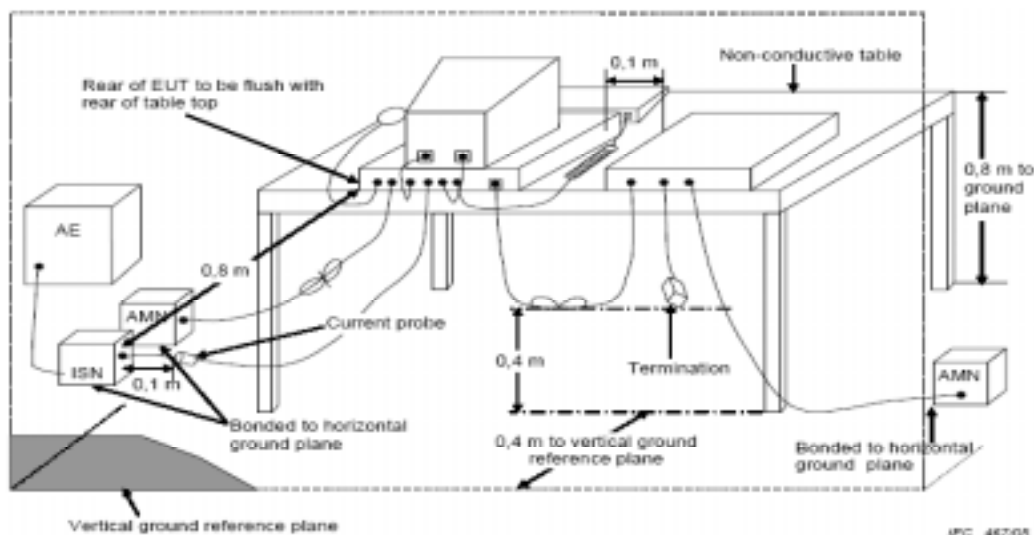
5.1. Description of Major Test Instruments

● Test Receiver	(R&S ESCS 30)
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

5.2. Test Procedures

- a. The EUT was placed on a desk 0.8 meters height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meters from any other grounded conducting surface.
- b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
- c. All the support units are connect to the other LISN.
- d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
- e. The CISPR states that a 50 ohm, 50 microhenry LISN should be used.
- f. Both sides of AC line were checked for maximum conducted interference.
- g. The frequency range from 150 kHz to 30 MHz was searched.
- h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

5.3. Typical Test Setup Layout of Conducted Powerline

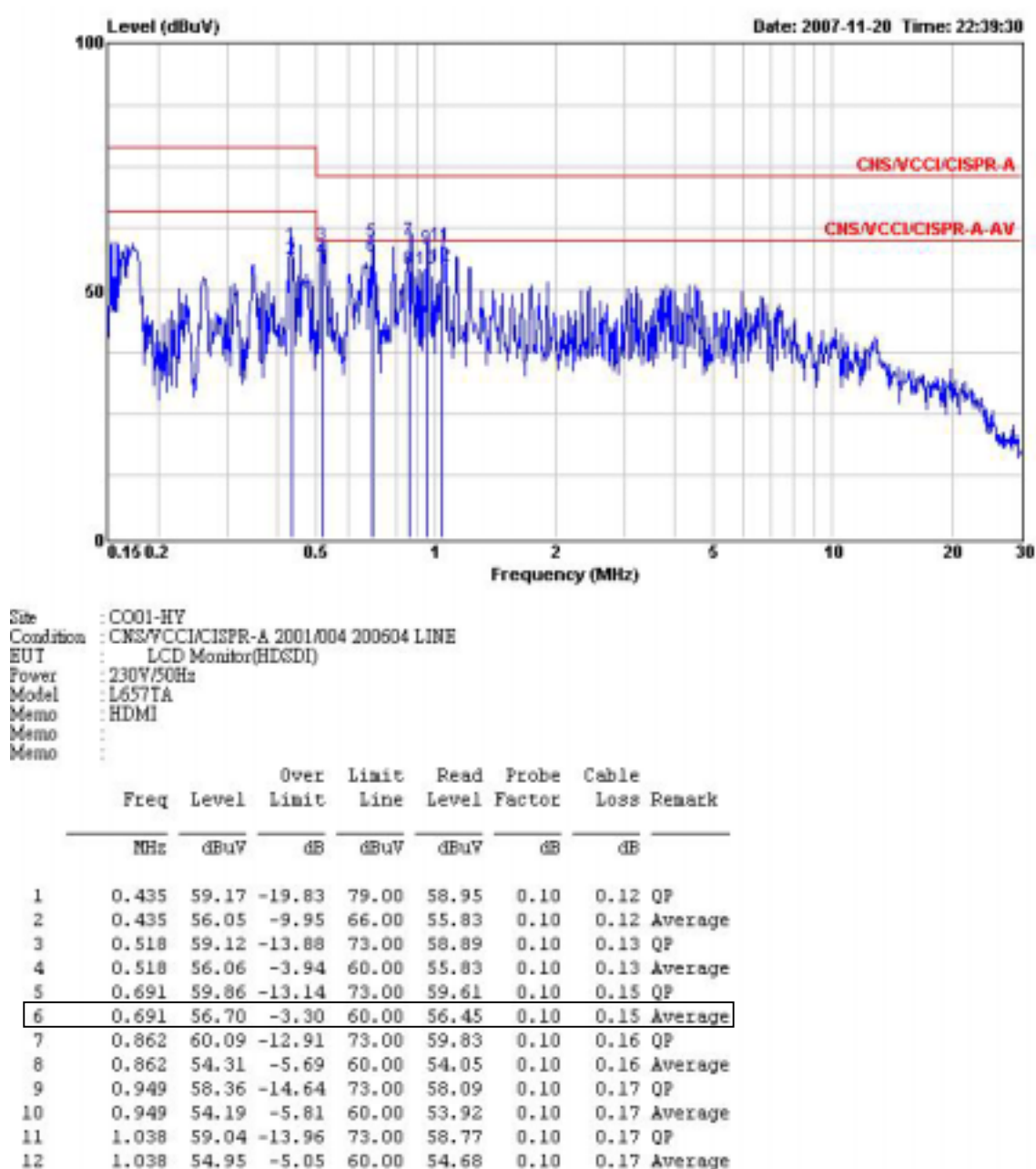


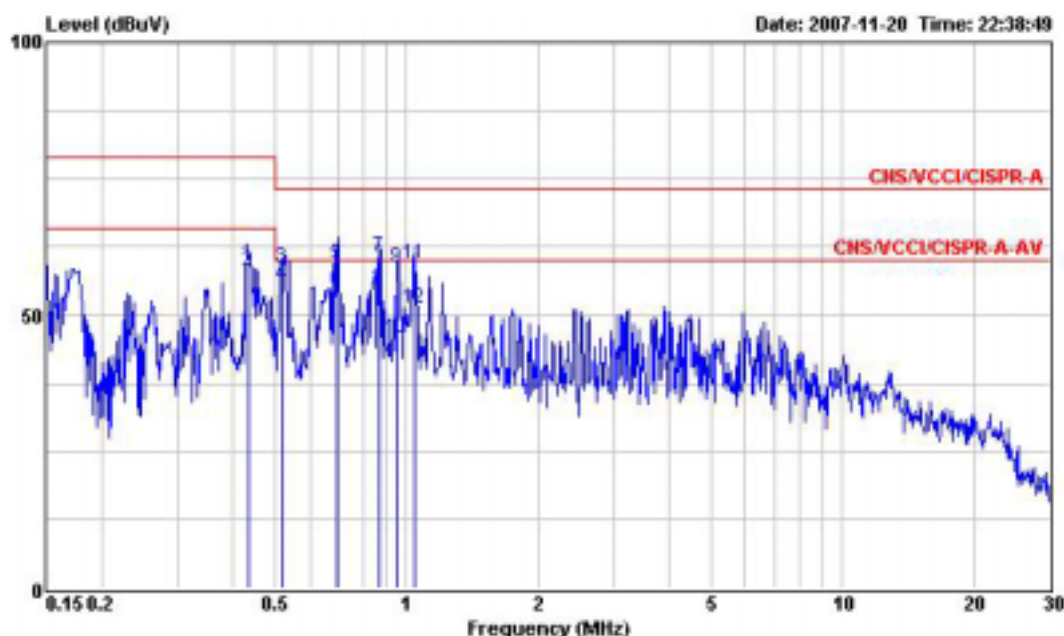
5.4. Test Result of AC Powerline Conducted Emission

5.4.1. Test Mode: Mode 6

- Frequency Range of Test: from 0.15 MHz to 30 MHz
- Temperature: 22 °C
- Relative Humidity: 52 %
- Corrected Reading (dBuV) = LISN Factor + Cable Loss + Read Level = Level
- All emissions not reported here are more than 10 dB below the prescribed limit.

■ The test was passed at the minimum margin that marked by the frame in the following table.





Site : CO01-HY
 Condition : CNS/VCCI/CISPR-A 2001/004 200604 NEUTRAL
 EUT : LCD Monitor(HDMI)
 Power : 230V/50Hz
 Model : L657TA
 Memo : HDMI
 Memo :
 Memo :

	Freq	Level	Over	Limit	Read	Probe	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.435	59.33	-19.67	79.00	59.11	0.10	0.12	QP
2	0.435	58.26	-7.74	66.00	58.04	0.10	0.12	Average
3	0.521	58.91	-14.09	73.00	58.68	0.10	0.13	QP
4	0.521	55.63	-4.37	60.00	55.40	0.10	0.13	Average
5	0.694	59.48	-13.52	73.00	59.23	0.10	0.15	QP
6	0.694	54.69	-5.31	60.00	54.44	0.10	0.15	Average
7	0.863	60.81	-12.19	73.00	60.55	0.10	0.16	QP
8	0.863	55.03	-4.97	60.00	54.77	0.10	0.16	Average
9	0.953	58.69	-14.31	73.00	58.42	0.10	0.17	QP
10	0.953	45.64	-14.36	60.00	45.37	0.10	0.17	Average
11	1.040	59.49	-13.51	73.00	59.22	0.10	0.17	QP
12	1.040	51.26	-8.74	60.00	50.99	0.10	0.17	Average

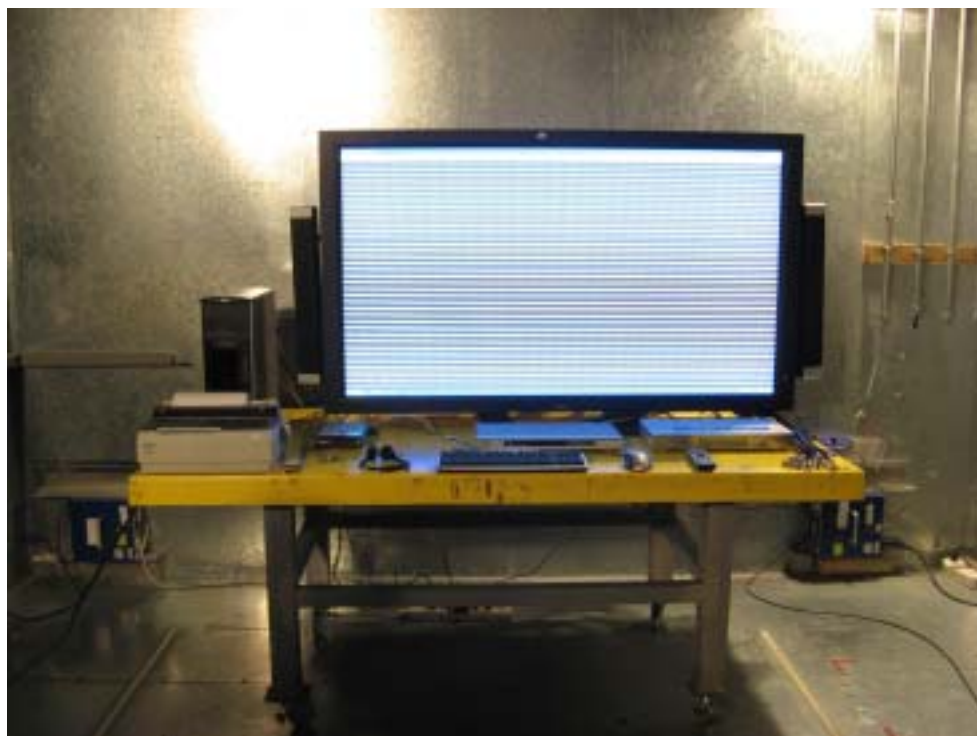
Test Engineer :

Tom Lee

5.5. Photographs of Conducted Powerline Test Configuration

- The photographs show the configuration that generates the maximum emission.

FRONT VIEW



REAR VIEW



6. Test of Radiated Emission

Radiated emissions from 30 MHz to 1000 MHz were measured with a bandwidth of 120 kHz according to the methods defines in European Standard EN 55022, Clause 10. The EUT was placed on a nonmetallic stand, 0.8 meter above the ground plane, as shown in section 6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

6.1. Description of Major Test Instruments

- Amplifier (HP 8447D)
 - RF Gain 25 dB
 - Signal Input 100 kHz - 1.3 GHz

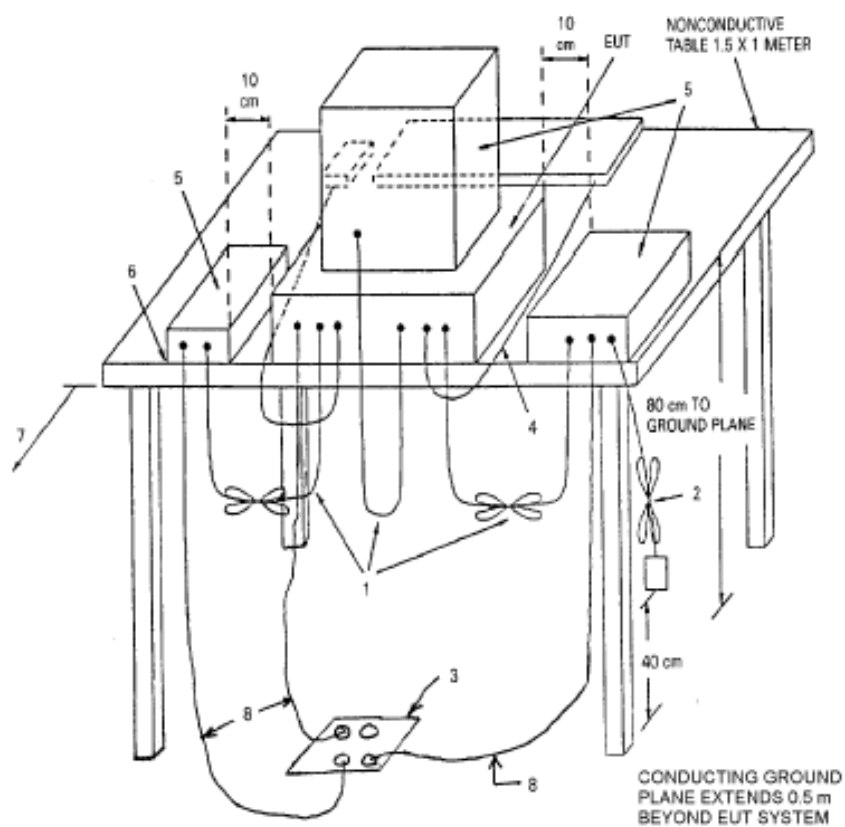
- Spectrum Analyzer (R&S FSP7)
 - Attenuation 10 dB
 - Start Frequency 30 MHz
 - Stop Frequency 1000 MHz
 - Resolution Bandwidth 120 kHz
 - Signal Input 9 kHz - 7 GHz

- Test Receiver (R&S ESI7)
 - Attenuation 10 dB
 - Start Frequency 30 MHz
 - Stop Frequency 1000 MHz
 - Resolution Bandwidth 120 kHz
 - Signal Input 9 kHz - 7 GHz

6.2. Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 10 meters from the interference receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.

6.3. Typical Test Setup Layout of Radiated Emission

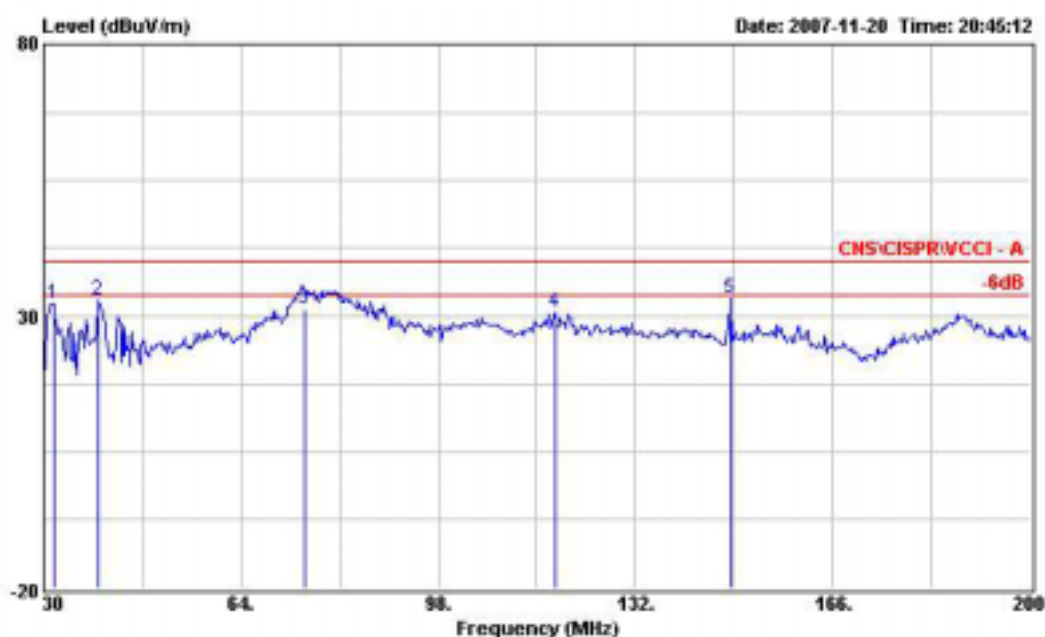


6.4. Test Result of Radiated Emission

6.4.1. Test Mode: Mode 3

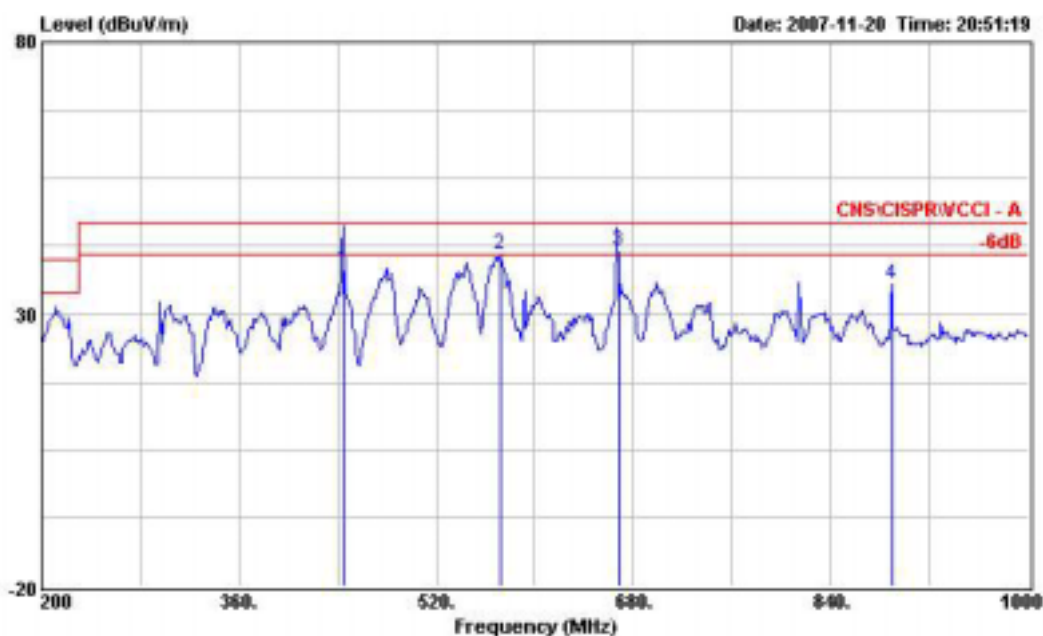
- Frequency Range of Test : from 30 MHz to 1000 MHz
- Temperature: 23 °C
- Relative Humidity: 64 %
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

■ The test was passed at the minimum margin that marked by the frame in the following test record



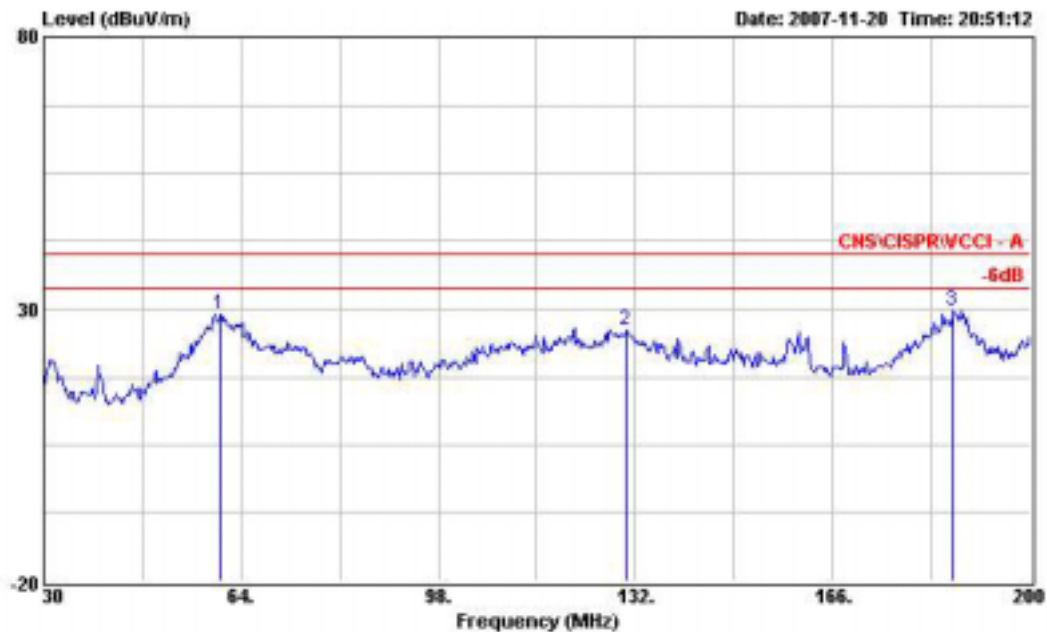
Site : 10CH01
 Condition : CNS/CISPR/VCCI - A 10m BICONICAL-950814 VERTICAL
 EUT :
 Power : 230V/50Hz
 model :
 Memo : HDSDI 1920*1080 60Hz
 Memo :
 Memo :

	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Rat Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	31.700	32.17	-7.83	40.00	46.15	13.27	1.20	28.45	Peak	---	---
2	39.350	32.93	-7.07	40.00	48.23	11.74	1.39	28.43	Peak	---	---
3	75.030	31.14	-8.86	40.00	48.43	8.98	2.08	28.35	QP	---	---
4	118.060	30.63	-9.37	40.00	45.31	11.19	2.34	28.21	Peak	---	---
5	148.150	33.30	-6.70	40.00	46.68	12.07	2.61	28.06	Peak	---	---



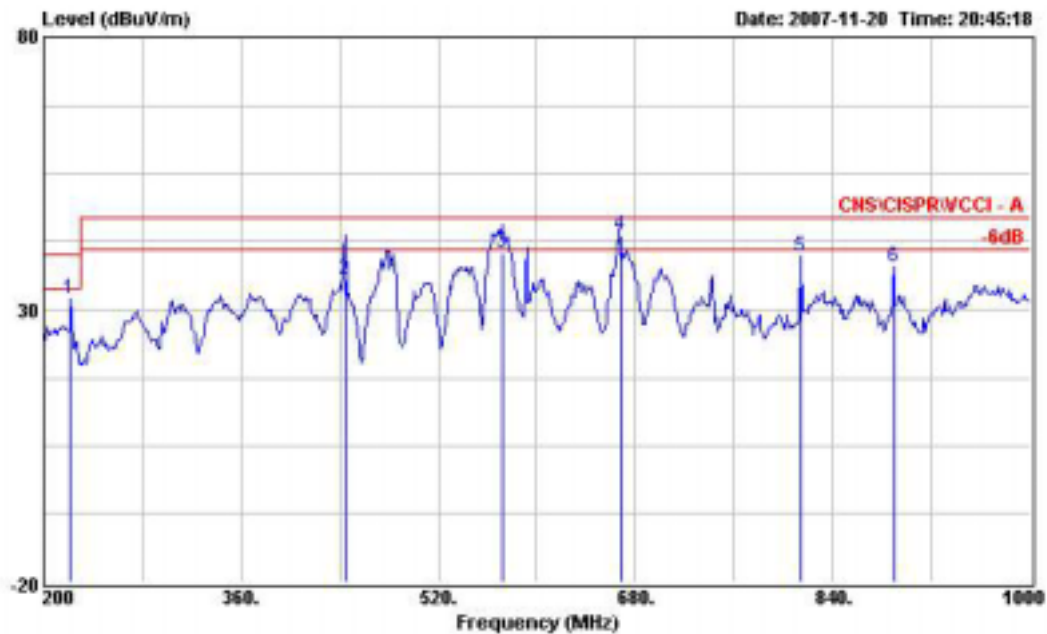
Site : 10CHD1
 Condition : CNS/CISPR/VCCI - A 10m LOG-950814 VERTICAL
 EUT :
 Power : 230V/50Hz
 model :
 Memo : HDSDI 1920+1080 60Hz
 Memo :
 Memo :

	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
			dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	445.030	37.97	-9.03	47.00	46.03	16.61	3.43	28.10	QP		
2	572.800	41.01	-5.99	47.00	46.04	18.81	3.81	28.45	Peak		
3	667.570	41.54	-5.46	47.00	45.80	19.87	4.13	28.26	QP		
4	889.600	35.49	-11.51	47.00	37.27	21.25	4.79	27.82	Peak		



Site : 10CH01
Condition : CNS/CISPR/VCCI-A 10m BICONICAL-950814 HORIZONTAL
EUT :
Power : 230V/50Hz
model :
Memo : HDSOI 1920*1080 60Hz
Memo :
Memo :

	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp	Remark	Ant	Table
			Limit	Line							
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	60.430	28.99	-11.01	40.00	46.30	9.36	1.71	28.38	Peak	---	---
2	130.470	26.26	-13.74	40.00	40.00	11.93	2.48	28.15	Peak	---	---
3	186.740	29.52	-10.48	40.00	40.56	14.02	2.80	27.86	Peak	---	---



Site : 10CH01
Condition : CNS/CISPR/VCCI - A 10m LOG-950814 HORIZONTAL
EUT :
Power : 230V/50Hz
model :
Memo : HDSDI 1920*1080 60Hz
Memo :
Memo :

	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Rnt	Yable
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	221.600	31.84	-8.16	40.00	41.74	15.05	2.41	27.36	Peak	---	---
2	445.020	35.41	-11.59	47.00	43.47	16.61	3.43	28.10	QP	---	---
3	572.000	40.27	-6.73	47.00	46.12	18.80	3.81	28.46	QP	---	---
4	667.580	43.74	-3.26	47.00	48.00	19.87	4.13	28.26	QP	400	300
5	813.600	39.84	-7.16	47.00	42.58	20.67	4.56	27.97	Peak	---	---
6	889.600	37.84	-9.16	47.00	39.62	21.25	4.79	27.82	Peak	---	---

Test Engineer :

Verson Wang

6.5. Photographs of Radiated Emission Test Configuration

- The photographs show the configuration that generates the maximum emission.

FRONT VIEW



REAR VIEW



7. Harmonics Test

7.1. Standard

- Standard : EN 61000-3-2:2000

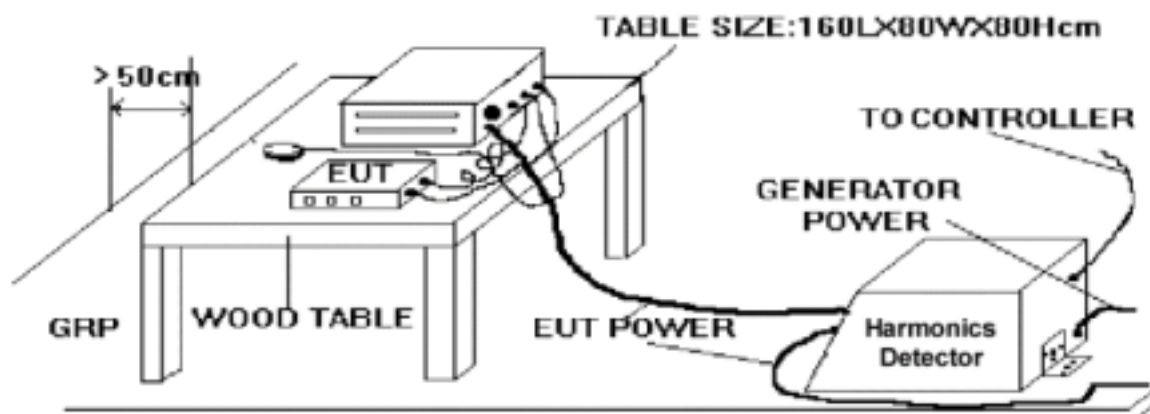
7.2. Test Procedure

The measured values of the harmonics components of the input current, including line current and neutral current, shall be compared with the limits given in Clause 7 of EN 61000-3-2.

7.3. Test Equipment Settings

- Line Voltage : 230 V
- Line Frequency : 50 Hz
- Device Class : D
- Current Measurement Range : High
- Measurement Delay : 10.0 seconds
- Test Duration : 2.00 minutes
- Class determination Pre-test Duration : 10.00 seconds

7.4. Test Setup



7.5. Current Harmonics Test

7.5.1. Test Data of Current Harmonics

- FINAL TEST RESULT : **PASS**
- Temperature : 22 °C
- Relative Humidity : 54 % RH
- Test Date : Nov. 21, 2007

Urms = 230.3V Freq = 49.987 Range: 10 A
 Irms = 2.534A Ipk = 4.775A cf = 1.884
 P = 498.9W S = 583.6VA pf = 0.855
 THDi = 29.4 % THDu = 0.10 % Class D

Test - Time :10min (100 %)

Limit Reference: Pmax = 501.64W

Test completed, Result: PASSED

Order	Iavg [A]	Iavg% [%]	Irms [A]	Irms% [%]	Imax [A]	Imax% [%]	Limit [A]	Status
1	2.4438	96.433	2.4237	95.641	7.5842	299.28		
2	0.0174	0.6880	0.0171	0.6744	0.0177	0.6985		
3	0.7268	28.679	0.7263	28.661	0.7288	28.757	1.7056	
4	0.0000	0.0000	0.0049	0.1927	0.0061	0.2408		
5	0.1422	5.6116	0.1416	5.5877	0.1434	5.6599	0.9531	
6	0.0000	0.0000	0.0018	0.0723	0.0024	0.0963		
7	0.0412	1.6274	0.0409	1.6137	0.0446	1.7582	0.5016	
8	0.0000	0.0000	0.0006	0.0241	0.0018	0.0723		
9	0.0086	0.3406	0.0146	0.5780	0.0159	0.6262	0.2508	
10	0.0000	0.0000	0.0012	0.0482	0.0037	0.1445		
11	0.0445	1.7557	0.0421	1.6618	0.0488	1.9268	0.1756	
12	0.0000	0.0000	0.0012	0.0482	0.0037	0.1445		
13	0.0201	0.7939	0.0189	0.7466	0.0226	0.8911	0.1486	
14	0.0000	0.0000	0.0024	0.0963	0.0031	0.1204		
15	0.0273	1.0768	0.0256	1.0116	0.0299	1.1802	0.1288	
16	0.0000	0.0000	0.0018	0.0723	0.0031	0.1204		
17	0.0162	0.6378	0.0153	0.6021	0.0195	0.7707	0.1136	
18	0.0000	0.0000	0.0012	0.0482	0.0043	0.1686		
19	0.0000	0.0000	0.0061	0.2408	0.0104	0.4094	0.1016	
20	0.0000	0.0000	0.0037	0.1445	0.0043	0.1686		
21	0.0003	0.0099	0.0122	0.4817	0.0165	0.6503	0.0920	
22	0.0000	0.0000	0.0055	0.2168	0.0061	0.2408		
23	0.0221	0.8708	0.0226	0.8911	0.0269	1.0597	0.0840	
24	0.0000	0.0000	0.0024	0.0963	0.0055	0.2168		
25	0.0037	0.1465	0.0116	0.4576	0.0183	0.7225	0.0773	
26	0.0000	0.0000	0.0024	0.0963	0.0073	0.2890		
27	0.0258	1.0165	0.0275	1.0838	0.0336	1.3247	0.0715	
28	0.0000	0.0000	0.0043	0.1686	0.0079	0.3131		
29	0.0009	0.0352	0.0043	0.1686	0.0183	0.7225	0.0666	
30	0.0000	0.0000	0.0031	0.1204	0.0073	0.2890		
31	0.0015	0.0573	0.0092	0.3613	0.0171	0.6744	0.0623	
32	0.0000	0.0000	0.0024	0.0963	0.0067	0.2649		
33	0.0000	0.0000	0.0098	0.3854	0.0122	0.4817	0.0585	
34	0.0000	0.0000	0.0024	0.0963	0.0037	0.1445		
35	0.0047	0.1867	0.0116	0.4576	0.0208	0.8189	0.0552	
36	0.0000	0.0000	0.0024	0.0963	0.0037	0.1445		
37	0.0211	0.8328	0.0208	0.8189	0.0232	0.9152	0.0522	
38	0.0000	0.0000	0.0012	0.0482	0.0043	0.1686		
39	0.0212	0.8373	0.0214	0.8430	0.0232	0.9152	0.0495	
40	0.0000	0.0000	0.0006	0.0241	0.0043	0.1686		

Test Engineer : Kero
 Kero Kao

8. Voltage Fluctuations Test

8.1. Standard

- Product Standard : EN 61000-3-3:1995/A1:2001

8.2. Test Procedure

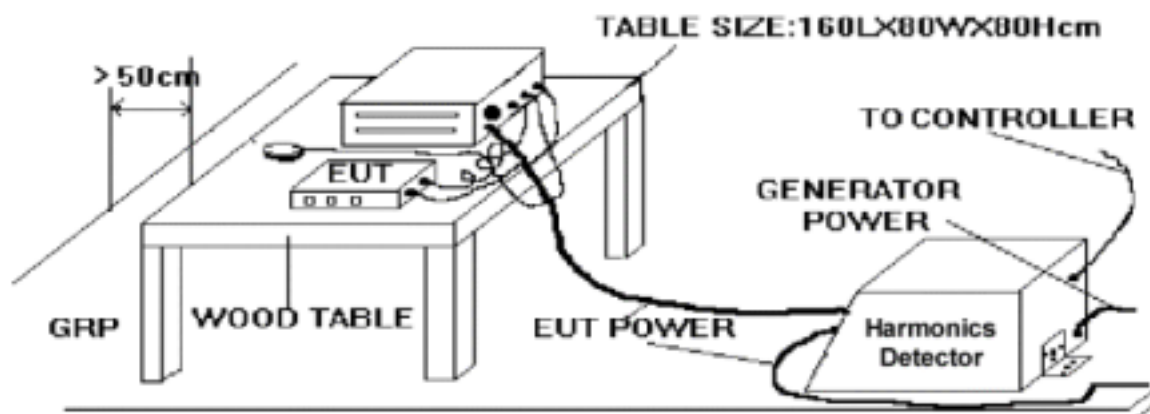
The equipment shall be tested under the conditions of **Clause 5**.

The total impedance of the test circuit, excluding the appliance under test, but including the internal impedance of the supply source, shall be equal to the reference impedance. The stability and tolerance of the reference impedance shall be adequate to ensure that the overall accuracy of $\pm 8\%$ is achieved during the whole assessment procedure.

8.3. Test Equipment Settings

- Line Voltage: 230 V
- Line Frequency: 50 Hz
- Measurement Delay: 10.0 seconds
- Pst Integration Time: 10 minutes
- Pst Integration Periods: 1
- Test Duration: 00:10:00 minutes

8.4. Test Setup



8.5. Test Result of Voltage Fluctuation and Flicker Test**8.5.1. Test Data of Voltage Fluctuation and Flicker**

- FINAL TEST RESULT : **PASS**
- Temperature : 22 °C
- Relative Humidity : 54 %
- Test Date : Nov. 21, 2007

Urms = 230.1V Freq = 49.987 Range: 10 A
Irms = 2.705A Ipk = 5.005A cf = 1.850
P = 536.0W Pap = 622.5VA pf = 0.861

Test - Time : 1 x 10min = 10min (100 %)

LIN (Line Impedance Network) : SLIN 0.24ohm +j0.15ohm N:0.16ohm +j0.10ohm

Limits : Plt : 0.65 Pst : 1.00
 dmax : 4.00 % dc : 3.30 %
 dtLim : 3.30 % dt>Lim: 500ms

Test completed, Result: PASSED

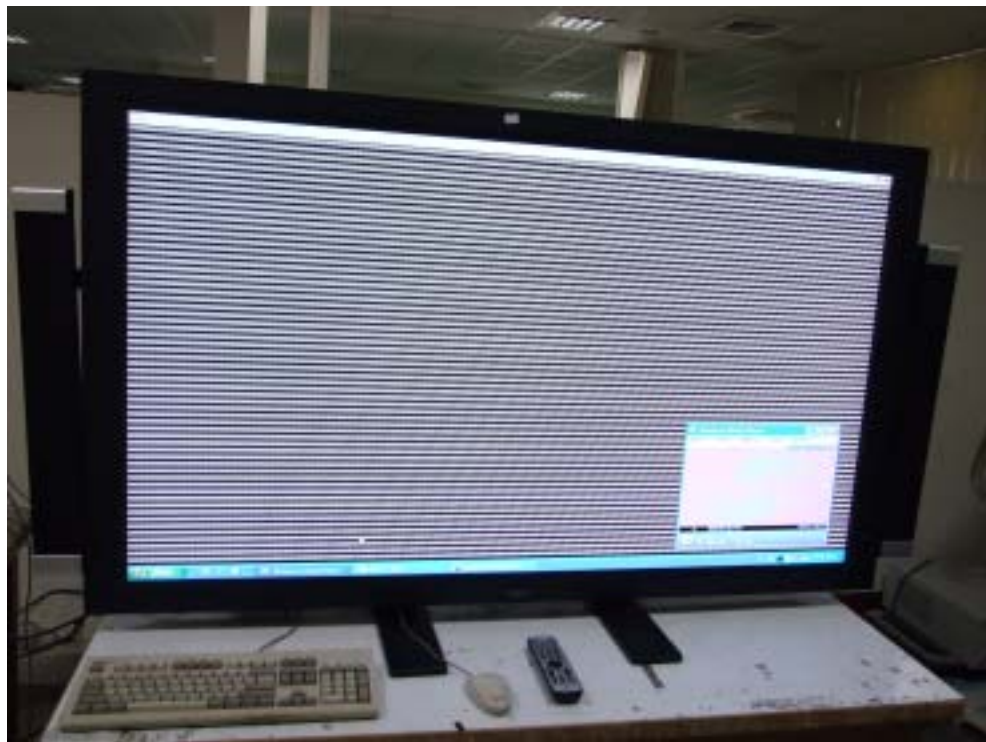
Plt = 0.072

	Pst	P50s	P10s	P3s	P1s	P0.1s	dmax	dc	dt>Lim
1	0.072	0.010	0.010	0.010	0.010	0.010	0.000	0.050	0.000

Test Engineer : Kero
Kero Kao

8.6. Photographs of Harmonics Test, Voltage Fluctuation and Flicker Test

FRONT VIEW



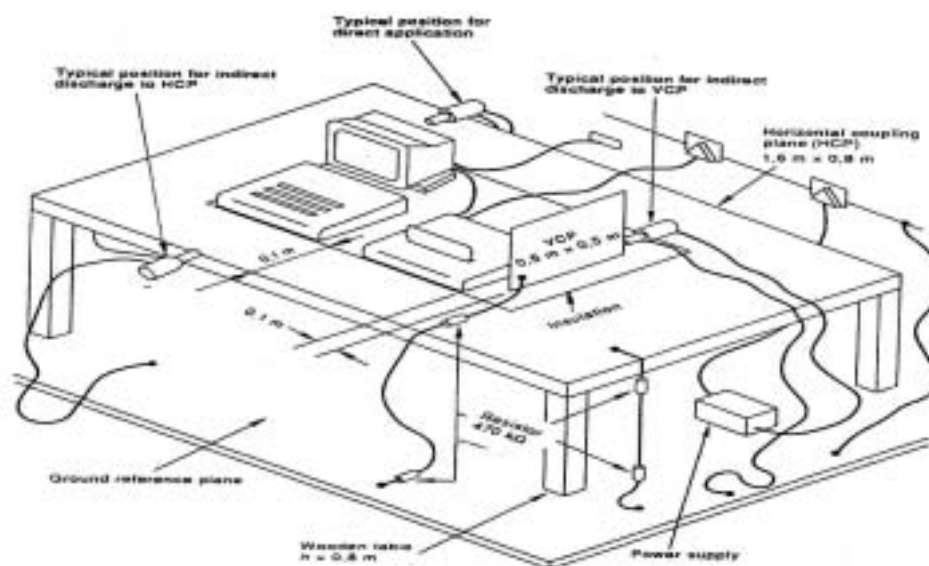
REAR VIEW



9. Electrostatic Discharge Immunity Test (ESD)

- FINAL TEST RESULT : **PASS**
- Pass Performance Criteria : B
- Required Performance Criteria : B
- Basic Standard : IEC 61000-4-2:1995/A2:2000
- Product Standard : EN 55024:1998/A1:2001/A2:2003
- Level : 3 for air discharge,
2 for contact discharge
- Tested Voltage : $\pm 2 / \pm 4 / \pm 8$ kV for air discharge,
 $\pm 2 / \pm 4$ kV for contact discharge
- Temperature : 23 °C
- Relative Humidity : 54 %
- Atmospheric Pressure : 100.1 kPa
- Test Date : Nov. 21, 2007
- Observation : During the test at contact discharge ± 4 kV on screw, there were noises shown on the screen. After the test, the equipment continued to operate as intended without operator intervention.

9.1. Test Setup



The test setup consists of the test generator, EUT and auxiliary instrumentation necessary to perform DIRECT and INDIRECT application of discharges to the EUT as applicable, in the follow manner :

- a. CONTACT DISCHARGE to the conductive surfaces and to coupling plane;
- b. AIR DISCHARGE at insulating surfaces.

The preferred test method is that of type tests performed in laboratories and the only accepted method of demonstrating conformance with this standard. The EUT was arranged as closely as possible to arrangement in final installed conditions.



9.2. Test Setup for Tests Performed in Laboratory

A ground reference plane was provided on the floor of the test site. It was a metallic sheet (copper or aluminum) of 0.25 mm, minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness. In the SPORTON EMC LAB., we provided 1 mm thickness aluminum ground reference plane or 1 mm thickness stainless steel ground reference plane. The minimum size of the ground reference plane is 1 m x 1 m, the exact size depending on the dimensions of the EUT. It was connected to the protective grounding system.

The EUT was arranged and connected according to its functional requirements. A distance of 1m minimum was provided between the EUT and the wall of the lab. and any other metallic structure. In cases where this length exceeds the length necessary to apply the discharges to the selected points, the excess length shall, where possible, be placed non-inductively off the ground reference plane and shall not come closer than 0.2m to other conductive parts in the test setup.

Where the EUT is installed on a metal table, the table was connected to the reference plane via a cable with a 470k ohm resistor located at each end, to prevent a build-up of charge. The test setup was consist a wooden table, 0.8m high, standing on the ground reference plane. A HCP, 1.6 m x 0.8 m, was placed on the table. The EUT and cables was isolated from the HCP by an insulating support 0.5 mm thick. The VCP size, 0.5 m x 0.5 m.

9.3. ESD Test Procedure

- a. In the case of air discharge testing the climatic conditions shall be within the following ranges:
 - ambient temperature: 15°C to 35°C;
 - relative humidity : 30% to 60%;
 - atmospheric pressure : 86 kPa (860 mbar) to 106 kPa (1060 mbar).
- b. Test programs and software shall be chosen so as to exercise all normal modes of operation of the EUT. The use of special exercising software is encouraged, but permitted only where it can be shown that the EUT is being comprehensively exercised.
- c. The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final severity level should not exceed the product specification value in order to avoid damage to the equipment.
- d. The test shall be performed with both air discharge and contact discharge. On preselected points at least 10 single discharges (in the most sensitive polarity) shall be applied on air discharge. On preselected points at least 25 single discharges (in the most sensitive polarity) shall be applied on contact discharge.
- e. For the time interval between successive single discharges an initial value of one second is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.
- f. In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.
- g. In the case of painted surface covering a conducting substrate, the following procedure shall be adopted:
 - If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate.
 - Coating declared as insulating by the manufacturer shall only be submitted to the air discharge.
 - The contact discharge test shall not be applied to such surfaces.
- h. In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT . After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.

9.4. Test Severity Levels

9.4.1. Contact Discharge

Level	Test Voltage (kV) of Contact discharge
1	± 2
2	± 4
3	± 6
4	± 8
X	Specified

Remark : "X" is an open level.

9.4.2. Air Discharge

Level	Test Voltage (kV) of Air Discharge
1	± 2
2	± 4
3	± 8
4	± 15
X	Specified

Remark : "X" is an open level.

9.5. Test Points

9.5.1. Test Result of Air Discharge

Test Point	Voltage	Tested No.
LED	$\pm 2 / \pm 4 / \pm 8$ kV	BY 10
D-SUB PORT	$\pm 2 / \pm 4 / \pm 8$ kV	BY 10
COM PORT	$\pm 2 / \pm 4 / \pm 8$ kV	BY 10
DVI PORT	$\pm 2 / \pm 4 / \pm 8$ kV	BY 10
MIC JACK	$\pm 2 / \pm 4 / \pm 8$ kV	BY 10
SPEAKER JACK	$\pm 2 / \pm 4 / \pm 8$ kV	BY 10
AC SOCKET	$\pm 2 / \pm 4 / \pm 8$ kV	BY 10
AV PORT	$\pm 2 / \pm 4 / \pm 8$ kV	BY 10
LCD Panel	$\pm 2 / \pm 4 / \pm 8$ kV	BY 10
S-VIDEO PORT	$\pm 2 / \pm 4 / \pm 8$ kV	BY 10
CONTROL BUTTON	$\pm 2 / \pm 4 / \pm 8$ kV	BY 10
HDSDI PORT	$\pm 2 / \pm 4 / \pm 8$ kV	BY 10

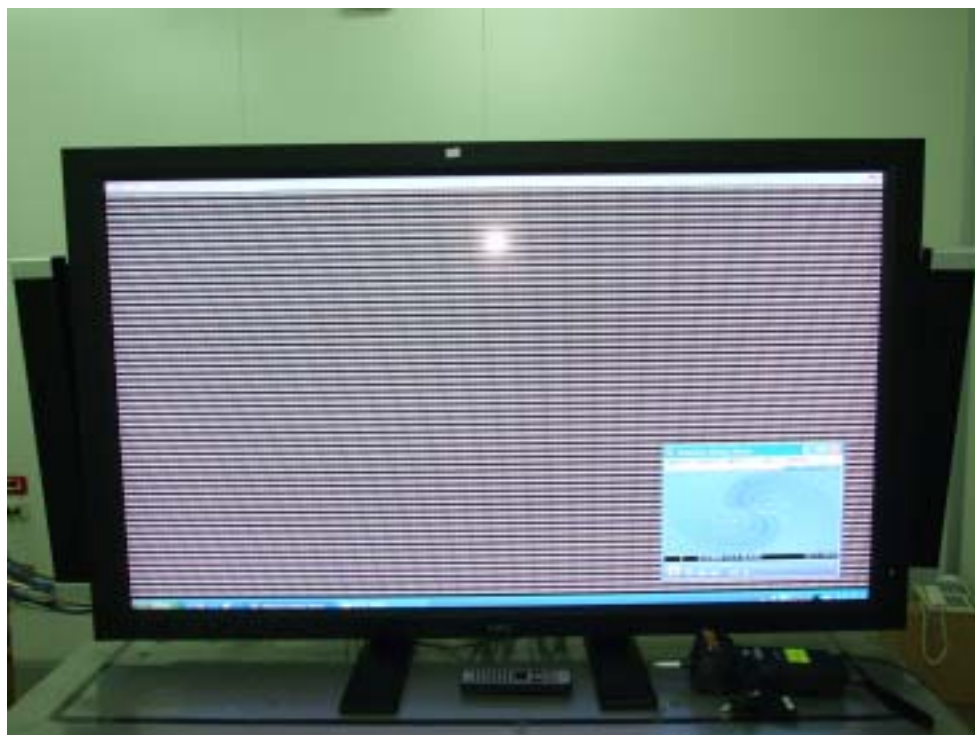
9.5.2. Test Result of Contact Discharge

Test Point	Voltage	Tested No.
HCP (At Front)	$\pm 2 / \pm 4 \text{ kV}$	BY 25
HCP (At Left)	$\pm 2 / \pm 4 \text{ kV}$	BY 25
HCP (At Right)	$\pm 2 / \pm 4 \text{ kV}$	BY 25
HCP (At Rear)	$\pm 2 / \pm 4 \text{ kV}$	BY 25
VCP (At Front)	$\pm 2 / \pm 4 \text{ kV}$	BY 25
VCP (At Left)	$\pm 2 / \pm 4 \text{ kV}$	BY 25
VCP (At Right)	$\pm 2 / \pm 4 \text{ kV}$	BY 25
VCP (At Rear)	$\pm 2 / \pm 4 \text{ kV}$	BY 25
CASE	$\pm 2 / \pm 4 \text{ kV}$	BY 25
SCREW	$\pm 2 / \pm 4 \text{ kV}$	BY 25
AV PORT	$\pm 2 / \pm 4 \text{ kV}$	BY 25
S-VIDEO PORT	$\pm 2 / \pm 4 \text{ kV}$	BY 25
BRACKET	$\pm 2 / \pm 4 \text{ kV}$	BY 25
HDSDI Port	$\pm 2 / \pm 4 \text{ kV}$	BY 25

Test Engineer : Kero
Kero Kao

9.6. Photographs of Electrostatic Discharge Immunity Test

FRONT VIEW



REAR VIEW



Second Table

FRONT VIEW



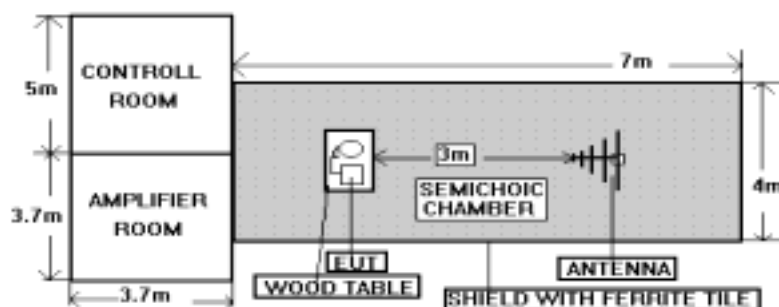
REAR VIEW



10. Radio Frequency Electromagnetic Field Immunity Test (RS)

- FINAL TEST RESULT : **PASS**
- Pass Performance Criteria : A
- Required Performance Criteria : A
- Basic Standard : IEC 61000-4-3:2002
- Product Standard : EN 55024:1998/A1:2001/A2:2003
- Level : 2
- Frequency Range : 80-1000 MHz
- Field Strength : 3 V/m (Modulated 80% AM at 1kHz)
- Temperature : 22 °C
- Relative Humidity : 52 %
- Atmospheric Pressure : 100.1 kPa
- Test Date : Nov. 21, 2007
- Observation : Normal

10.1. Test Setup



NOTE : The SPORTON 7m x 4m x 4m semichoice chamber is compliance with the sixteen points uniform field requirement as stated in IEC 1000-4-3 Section 6.2.

The procedure defined in this part requires the generation of electromagnetic fields within which the test sample is placed and its operation observed. To generate fields that are useful for simulation of actual (field) conditions may require significant antenna drive power and the resultant high field strength levels. To comply with local regulations and to prevent biological hazards to the testing personnel, it is recommended that these tests be carried out in a shielded enclosure or semichoice chamber.

10.2. Test Procedure

- a. The equipment to be tested is placed in the center of the enclosure on a wooden table. The equipment is then connected to power and signal leads according to pertinent installation instructions.
- b. The bilog antenna which is enabling the complete frequency range of 80-1000 MHz is placed 3m away from the equipment. The required field strength is determined by placing the field strength meter(s) on top of or directly alongside the equipment under test and monitoring the field strength meter via a remote field strength indicator outside the enclosure while adjusting the continuous-wave to the applicable antennae.
- c. The test is normally performed with the generating antenna facing each of four sides of the EUT. The polarization of the field generated by the broadband (bilog) antenna necessitates testing each position twice, once with the antenna positioned vertically and again with the antenna positioned horizontally.
- d. At each of the above conditions, the frequency range is swept 80-1000 MHz, pausing to adjust the R.F. signal level or to switch oscillators and antenna. The rate of sweep is in the order of 1.5×10^{-3} decades/s. The sensitive frequencies or frequencies of dominant interest may be discretely analyzed.

10.3. Test Severity Levels

Frequency Band : 80-1000 MHz

Level	Test field strength (V/m)
1	1
2	3
3	10
X	Specified

Remark : "X" is an open class.

Test Engineer :


Kero Kao

10.4. Photographs of Radio Frequency Electromagnetic Field Immunity Test

FRONT VIEW



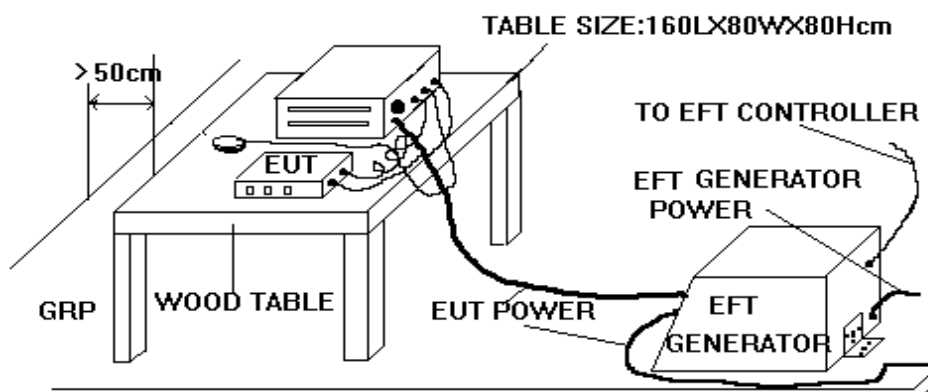
REAR VIEW



11. Electrical Fast Transient/Burst Immunity Test (EFT/BURST)

- FINAL TEST RESULT : **PASS**
- Pass Performance Criteria : A
- Required Performance Criteria : B
- Basic Standard : IEC 61000-4-4:1995/A2:2001
- Product Standard : EN 55024:1998/A1:2001/A2:2003
- Level : on Power Supply -- 2
on I/O signal, data and control line -- 2
- Test Voltage : on Power Supply -- $\pm 0.5 / \pm 1.0$ kV
on I/O signal, data and control line -- $\pm 0.25 / \pm 0.5$ kV
- Temperature : 23 °C
- Relative Humidity : 51 %
- Atmospheric Pressure : 100.1 kPa
- Test Date : Nov. 21, 2007
- Observation : Normal

11.1. Test setup



The EUT was placed on a ground reference plane and was insulated from it by an insulating support about 0.1m thick. If the EUT is table-top equipment, it was located approximately 0.8m above the GRP. The GRP was a metallic sheet (copper or aluminum) of 0.25 mm ,minimum thickness; other metallic may be used but they shall have at least 0.65 mm thickness. It shall project beyond the EUT by at least 0.1m on all sides and connected to the protective earth. In the SPORTON EMC LAB. We provided 1 mm thickness aluminum ground reference plane or 1 mm thickness stainless steel ground reference plane. The minimum size of the ground reference plane is 1 m x 1 m, the exact size depending on the dimensions of the EUT. It was connected to the protective grounding system. The EUT was arranged and connected according to its functional requirements. The minimum distance between the EUT and other conductive structures, except the GRP. Beneath the EUT, was more than 0.5 m. Using the coupling clamp, the minimum distance between the coupling plates and all other conductive structures, except the GRP. Beneath the EUT, was more than 0.5 m. The length of the signal and power lines between the coupling device and the EUT was 1m or less.

11.2. Test on Power Line

- a. The EFT/B-generator was located on the GRP.. The length from the EFT/B-generator to the EUT as not exceed 1 m.
- b. The EFT/B-generator provides the ability to apply the test voltage in a non-symmetrical condition to the power supply input terminals of the EUT.

11.3. Test on Communication Lines

- a. The coupling clamp is composed of a clamp unit for housing the cable (length more than 3 m), and was placed on the GRP..
- b. The coupling clamp provides the ability of coupling the fast transient/bursts to the cable under test.

11.4. Test Procedure

- a. In order to minimize the effect of environmental parameters on test results, the climatic conditions when test is carrying out shall comply with the following requirements:
 - ambient temperature: 15°C to 35°C;
 - relative humidity : 45% to 75%;
 - atmospheric pressure : 86 kPa (860 mbar) to 106 kPa (1060 mbar).
- b. In order to minimize the effect of environmental parameters on test results, the electromagnetic environment of the laboratory shall not influence the test results.
- c. The variety and diversity of equipment and systems to be tested make it difficult to establish general criteria for the evaluation of the effects of fast transients/bursts on equipment and systems.
- d. The test results may be classified on the basic of the operating conditions and the functional specification of the equipment under test, according to the following performance criteria :
 - Normal performance within the specification limits.
 - Temporary degradation or loss of function or performance which is self-recoverable.
 - Temporary degradation or loss of function or performance which requires operator intervention or system reset.
 - Degradation or loss of function which is not recoverable due to damage of equipment (components).

11.5. Test Severity Levels

The following test severity levels are recommended for the fast transient/burst test :

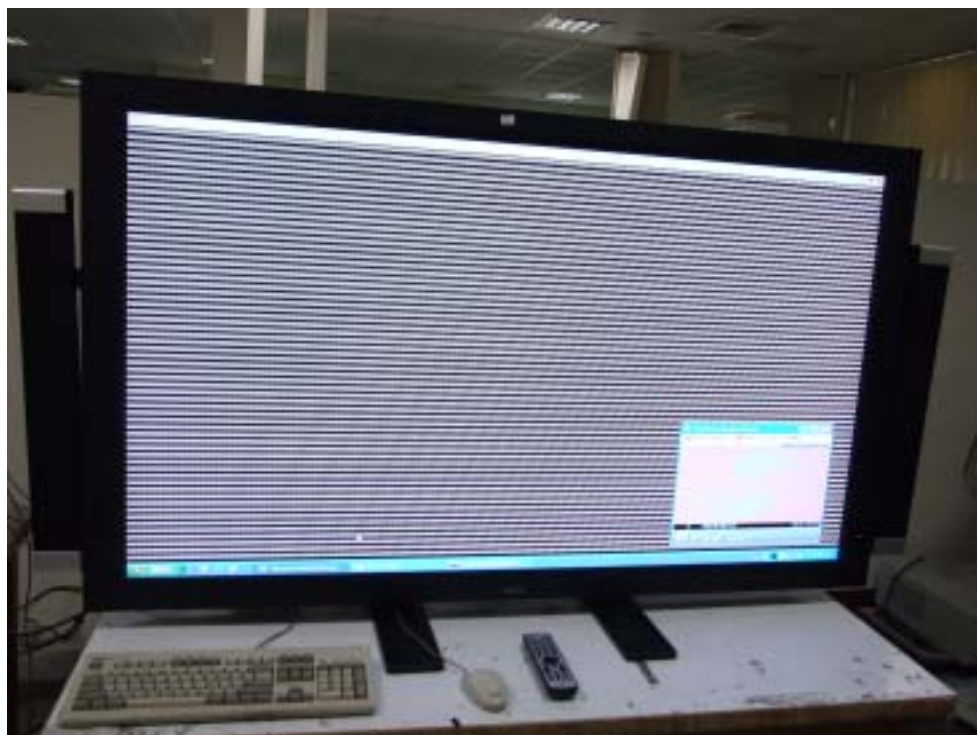
Open circuit output test voltage $\pm 10\%$		
Level	On Power Supply	On I/O signal, data and control line
1	0.5 kV	0.25 kV
2	1.0 kV	0.50 kV
3	2.0 kV	1.00 kV
4	4.0 kV	2.00 kV
X	Specified	Specified

Remark : " X " is an open level. The level is subject to negotiation between the user and the manufacturer or is specified by the manufacturer.

Test Engineer : Kero
Kero Kao

11.6. Photographs of Electrical Fast Transient/BURST Immunity Test

FRONT VIEW



REAR VIEW



CLAMP



12. Surge Immunity Test

- FINAL TEST RESULT : **PASS**
- Pass Performance Criteria : A
- Required Performance Criteria : B
- Basic Standard : IEC 61000-4-5:1995/A1:2000
- Product Standard : EN 55024:1998/A1:2001/A2:2003
- Surge Wave Form (Tr/Th) : 1, 2/50 (8/20) μ s
- Level : on BNC port – 2
: on Input AC Power Port – 3
- Test Voltage : on BNC – $\pm 0.5/1.0$ kV
: on Input AC Power Port – $\pm 0.5/1.0/2.0$ kV
- Temperature : 24 °C
- Relative Humidity : 53 %
- Atmospheric Pressure : 100.1 kPa
- Test Date : Nov. 21, 2007
- Observation : Normal

12.1. Test Record

■ AC Power Port:

Voltage (kV)	Test Location	Polarity	Phase Angle				Test Result
			0°	90°	180°	270°	
1 kV	L - N	+	A	A	A	A	<u>PASS</u>
		-	A	A	A	A	<u>PASS</u>
2 kV	L - PE	+	A	A	A	A	<u>PASS</u>
		-	A	A	A	A	<u>PASS</u>
	N - PE	+	A	A	A	A	<u>PASS</u>
		-	A	A	A	A	<u>PASS</u>

⊕ *Remark : PE = Earth reference*

■ BNC Ports:

Location	Polarity	Phase Angle	No of Pulse	Pulse Voltage	sec / 1 Pulse	Result
Line-G	+	-	5	0.5/1 KV	60	<u>Pass</u>
Line-G	-	-	5	0.5/1 KV	60	<u>Pass</u>

12.2. Test Level

Level	Open-circuit test voltage, $\pm 10\%$, kV
1	0.5
2	1.0
3	2.0
4	4.0
x	Specified
NOTE - x is an open class. This level can be specified in the product specification.	

12.3. Test Procedure

a. Climatic conditions

The climatic conditions shall comply with the following requirements :

- ambient temperature : 15 °C to 35 °C
- relative humidity : 10 % to 75 %
- atmospheric pressure : 86 kPa to 106 kPa (860 mbar to 1060 mbar)

b. Electromagnetic conditions

The electromagnetic environment of the laboratory shall not influence the test results.

The test shall be performed according the test plan that shall specify the test set-up with

- generator and other equipment utilized;
- test level (voltage/current);
- generator source impedance;
- internal or external generator trigger;
- number of tests : at least five positive and five negative at the selected points;
- repetition rate : maximum 1/min.
- inputs and outputs to be tested;
- representative operating conditions of the EUT;
- sequence of application of the surge to the circuit;
- phase angle in the case of a.c. power supply;
- actual installation conditions, for example :
AC : neutral earthed,
DC : (+) or (-) earthed to simulated the actual earthing conditions.

- c. If not otherwise specified the surges have to be applied synchronized to the voltage phase at the zero-crossing and the peak value of the a.c. voltage wave (positive and negative).

- d. The surges have to be applied line to line and line(s) and earth. When testing line to earth, the test voltage has to be applied successively between each of the lines and earth, if there is no other specification.
- e. The test procedure shall also consider the non-linear current-voltage characteristics of the equipment under test. Therefore the test voltage has to be increased by steps up to the test level specified in the product standard or test plan.
- f. All lower levels including the selected test level shall be satisfied. For testing the secondary protection, the output voltage of the generator shall be increased up to the worstcase voltage breakdown level (let-through level) of the primary protection.
- g. If the actual operating signal sources are not available, they may be simulated. Under no circumstances may the test level exceed the product specification. The test shall be carried out according to a test plan.
- h. To find all critical points of the duty cycle of the equipment, a sufficient number of positive and negative test pulses shall be applied. For acceptance test a previously unstressed equipment shall be used to the protection devices shall be replaced.

12.4. Operating Condition

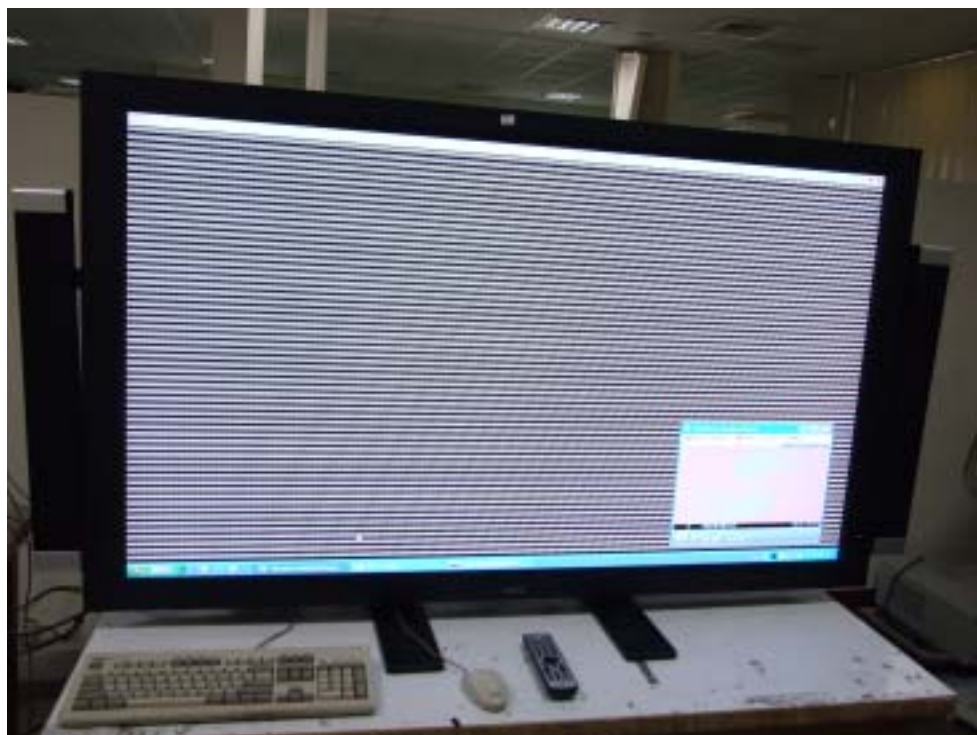
Full system

Test Engineer :

Kero
Kero Kao

12.5. Photographs of Surge Immunity Test

FRONT VIEW



REAR VIEW



13. Conducted Disturbances Induced by Radio-Frequency Field Immunity Test (CS)

- FINAL TEST RESULT : **PASS**
- Pass Performance Criteria : A
- Required Performance Criteria : A
- Basic Standard : IEC 61000-4-6:1996/A1:2000
- Product Standard : EN 55024:1998/A1:2001/A2:2003
- Level : 2
- Test Voltage : 3 V rms (Modulated, 1kHz, 80%, AM)
- Frequency Range : 0.15 MHz to 80 MHz
- Dwell Time : 2.9 seconds
- Frequency Step Size : 1 %
- Coupling Mode : CDN-M16 SW M3 for AC power ports, Clamp-EM Injection Clamp
- Temperature : 23 °C
- Relative Humidity : 52 %
- Atmospheric Pressure : 100.1 kPa
- Test Date : Nov. 21, 2007
- Observation : Normal

13.1. Test Level

Level	Voltage Level (EMF)
1	1 V
2	3 V
3	10 V
x	Specified
NOTE - x is an open class. This level can be specified in the product specification.	

13.2. Operating Condition

Full system

13.3. Test Procedure

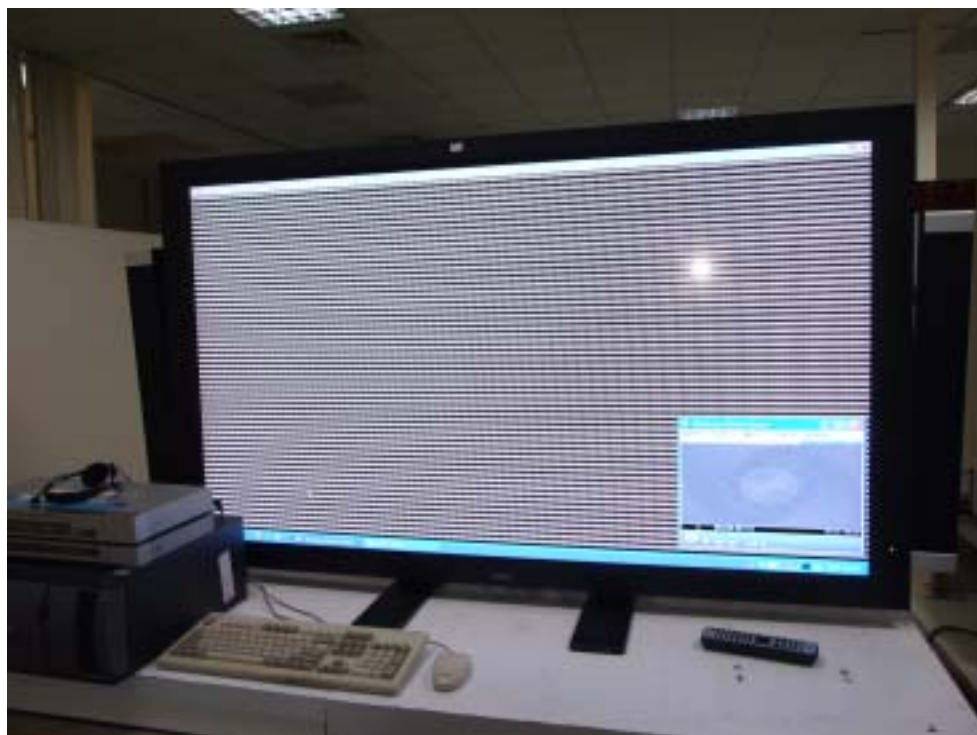
- a. The EUT shall be operated within its intended climatic conditions. The temperature and relative humidity should be recorded.
- b. This test method test can be performed without using a sell shielded enclosure. This is because the disturbance levels applied and the geometry of the setups are not likely to radiated a high amount of energy, especially at the lower frequencies. If under certain circumstances the radiated energy is too high, a shielded enclosure has to be used.
- c. The test shall be performed with the test generator connected to each of the coupling and decoupling devices in turn while the other non-excited RF-input ports of the coupling devices are terminated by a 50 ohm load resistor.
- d. The frequency range is swept from 150 kHz to 80 MHz, using the signal levels established during the setting process, and with the disturbance signal 80% amplitude modulated with a 1kHz sinewave, pausing to adjust the RF-signal level or to switch coupling devices as necessary. The rate of sweep shall no exceed 1.5×10^{-3} decades/s. Where the frequency is swept incrementally, the step size shall no exceed 1% of the start and thereafter 1% of the preceding frequency value.
- e. The dwell time at each frequency shall not be less than the time necessary for the EUT to be exercised, and able to respond. Sensitive frequencies e.g. clock frequency(ies) and harmonics or frequencies of dominant interest shall be analyzed separately.
- f. An alternative test procedure may be adopted, wherein the frequency range is swept incrementally, with a step size not exceeding 4% of the start ad thereafter 4% of the preceding frequency value. The test level should be at least twice the value of the specified test level.
- g. In cases of dispute, the test procedure using a step size not exceeding 1% of the start and thereafter 1% of preceding frequency value shall take precedence.
- h. Attempts should be made to fully exercise the EUT during testing, and to fully interrogate all exercise modes selected for susceptibility.
- i. The use of special exercising programs is recommended.
- j. Testing shall be performed according to a Test Plan, which shall be included in the test report.
- k. It may be necessary to carry out some investigatory testing in order to establish some aspects of the test plan.

Test Engineer : Kero

Kero Kao

13.4. Photographs of CS tests

FRONT VIEW



REAR VIEW



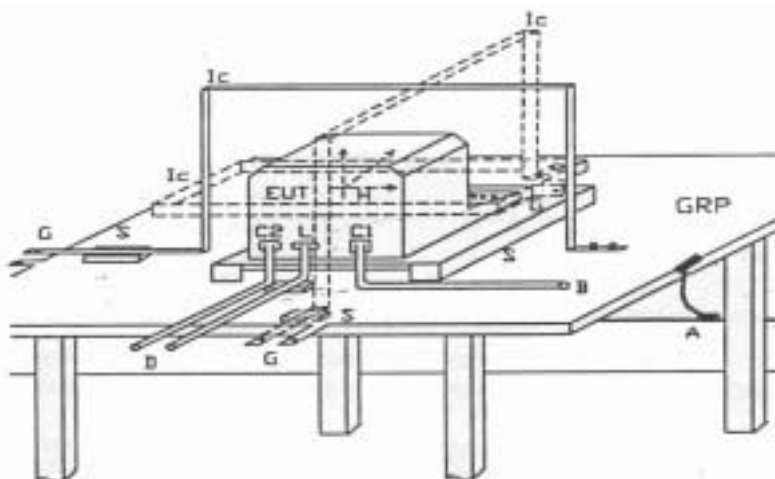
14. Power Frequency Magnetic Field immunity tests

- FINAL TEST RESULT : **PASS**
- Pass Performance Criteria : A
- Required Performance Criteria : A
- Basic Standard : IEC 61000-4-8:1993/A1:2000
- Product Standard : EN 55024:1998/A1:2001/A2:2003
- Temperature : 25 °C
- Relative Humidity : 53 %
- Atmospheric Pressure : 100.1 kPa
- Test Date : Nov. 21, 2007
- Observation : Normal

14.1. Test Record

Power Frequency Magnetic Field	Testing duration	Coil Orientation	Results
50Hz, 1A/m	1.0 Min	X-axis	Pass
50Hz, 1A/m	1.0 Min	Y-axis	Pass
50Hz, 1A/m	1.0 Min	Z-axis	Pass

14.2. Test Setup



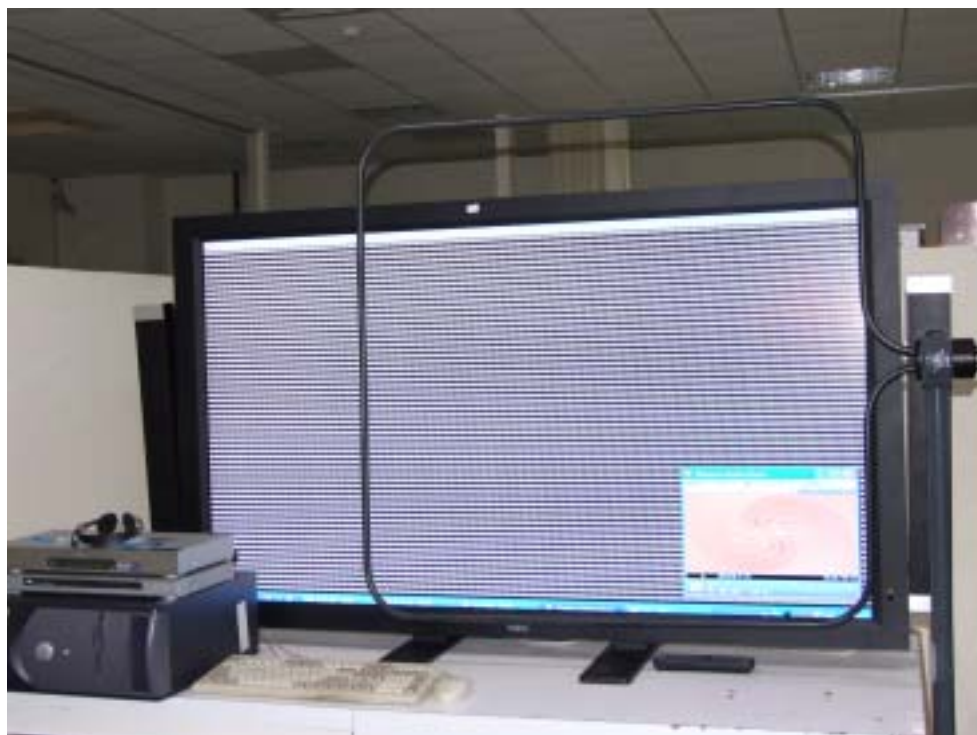
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|------|----------------------|-----|-----------------------------|
| GRP: | Ground plane | C1: | Power supply circuit |
| A: | Safety earth | C2: | Signal circuit |
| S: | Insulating support | L: | Communication line |
| EUT: | Equipment under test | B: | To power supply source |
| Lc: | Induction coil | D: | To signal source, simulator |
| E: | Earth terminal | G: | To the test generator |

Test Engineer : Kero

Kero Kao

14.3. Photographs of Power Frequency Magnetic Field Immunity Tests

FRONT VIEW



REAR VIEW



15. Voltage Dips and Voltage Interruptions Immunity Tests

- FINAL TEST RESULT : **PASS**
- Pass performance Criteria : C for voltage interruption, B for voltage dips
- Required performance criteria : C for voltage interruption, B/C for voltage dips
- Basic Standard : IEC 61000-4-11:1994/A1:2000
- Product Standard : EN 55024:1998/A1:2001/A2:2003
- Temperature : 24 °C
- Relative Humidity : 53 %
- Atmospheric Pressure : 100.1 kPa
- Test Date : Nov. 21, 2007
- Observation : Normal

15.1. Test Record of Voltage Interruption

Voltage (V)	Phase Angle		% Reduction	Duration (periods)	Observation
	0 °	180 °			
100/240	C	C	>95%	250	After the interruption, the power of EUT was off. The power of the EUT must be reset by the operator.

15.2. Test Record of Voltage Dips

Voltage (V)	Phase Angle		% Reduction	Duration (periods)	Observation
	0 °	180 °			
100/240	B	B	30	25	Normal
100/240	B	B	>95 %	0.5	Normal

15.3. Testing Requirement and Procedure

The test was based on IEC 61000-4-11:1994/A1:2000

15.4. Test Conditions

1. Source voltage and frequency : 100/240V / 50Hz, Single phase.



2. Test of interval : 10 sec.
3. Level and duration : Sequency of 3 dips/interrupts.
4. Voltage rise (and fall) time : 1 ~ 5 μ s.

15.5. Operating Condition

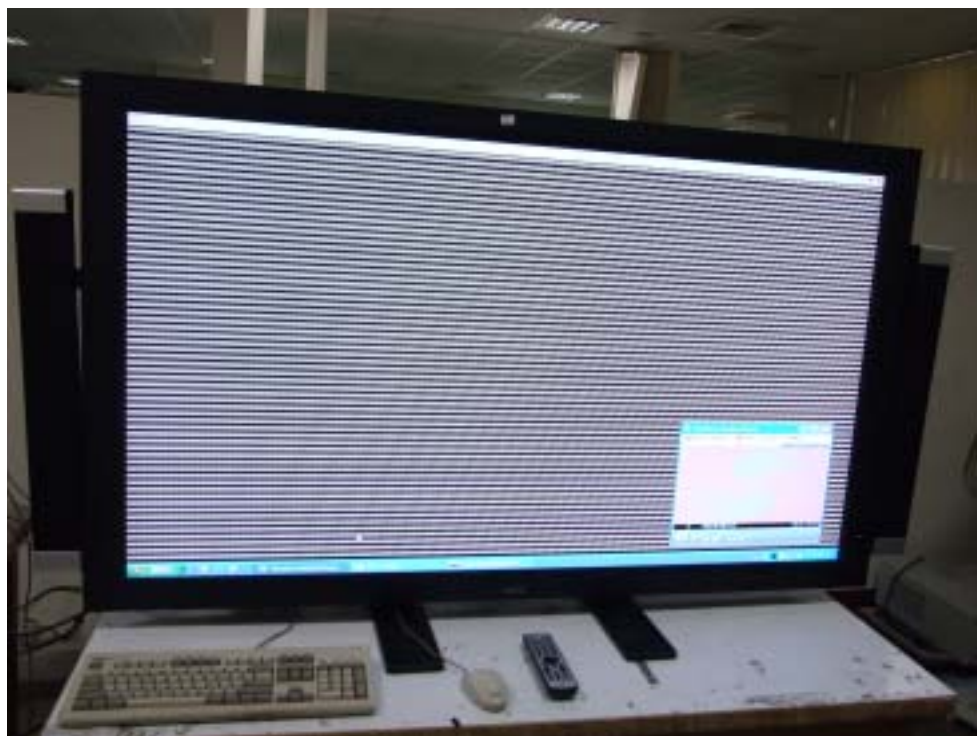
Full system

Test Engineer :

Kero Kao

15.6. Photographs of Voltage Dips and Voltage Interruptions Immunity Tests

FRONT VIEW



REAR VIEW



16. List of Measuring Equipment Used

<EMI>

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
EMC Receiver	R&S	ESCS 30	100132	9kHz – 2.75GHz	Jul. 14, 2007	Conduction (CO01-HY)
LISN	MessTec	NNB-2/16Z	2001/004	9kHz – 30MHz	Mar. 29, 2007	Conduction (CO01-HY)
LISN (Support Unit)	MessTec	NNB-2/16Z	2001/009	9kHz – 30MHz	Mar. 30, 2007	Conduction (CO01-HY)
EMI Filter	LINDGREN	LRE-2060	1004	< 450Hz	N/A	Conduction (CO01-HY)
EMI Filter	LINDGREN	N6006	201052	0 – 60Hz	N/A	Conduction (CO01-HY)
RF Cable-CON	Suhner Switzerland	RG223/U	CB029	9kHz – 30MHz	Dec. 04, 2006	Conduction (CO01-HY)
10m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-10M	10CH01-HY	30MHz~1GHz 10m, 3m	Apr. 14, 2007	Radiation (10CH01-HY)
Spectrum Analyzer	R&S	FSP7	838858/013	9kHz – 7GHz	Feb. 13, 2007	Radiation (10CH01- HY)
Receiver	R&S	ESI7	838496/009	9kHz-7GHz	Jan. 29, 2007	Radiation (10CH01-HY)
Amplifier	Aglient	8447D	2944A10825	100kHz – 1.3GHz	May. 24, 2007	Radiation (10CH01-HY)
Amplifier	Aglient	8447D	2944A10826	100kHz – 1.3GHz	May. 29, 2007	Radiation (10CH01-HY)
Biconical Antenna	Schwarzbeck	VHBB 9124	286	30MHz –200MHz	Aug. 14, 2007	Radiation (10CH01-HY)
Log Antenna	Schwarzbeck	VUSLP 9111	206	200MHz -1GHz	Aug. 14, 2007	Radiation (10CH01-HY)
Turn Table	HD	DT 60 RPS	1513/004/00	0 ~ 360 degree	N/A	Radiation (10CH01-HY)
Antenna Mast	HD	MA240	240/556/00	1 m - 4 m	N/A	Radiation (10CH01-HY)
Antenna Mast	HD	MA240	240/559/00	1 m - 4 m	N/A	Radiation (10CH01-HY)
RF Cable-R10m	BELDEN	RG8/U	CB023-INSIDE	30MHz~1GHz	Nov. 30, 2006	Radiation (10CH01-HY)
RF Cable-R10m	Suhner Switzerland + Rosenberger	RG223/U + UAA220A-0	CB022-DOOR	30MHz~1GHz	Nov. 30, 2006	Radiation (10CH01-HY)

Calibration Interval of instruments listed above is one year.

<EMS>

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
ESD Simulator	KEYTEK	MZ-15/EC	9503213	Air: 0 kV - 15 kV Contact: 0 kV - 8 kV	Jun. 28, 2007	ESD
Antenna	FRANKONIA	BTA-L	02002L	26 MHz - 1 GHz	Nov. 01, 2007	RS
RS immunity Test system	HP	EMS test System	2062	80 MHz - 1 GHz 3V/m 10v/m	Nov. 21, 2007	RS
Amplifier	AR	250W 1000AM1	320482	80 MHz - 1 GHz	Nov. 21, 2007	RS
Power Meter	EMC Automation	438A	3513U04050	100 kHz - 4.2 GHz	Nov. 22, 2007	RS
Signal Generator	HP	8648A	3426A00771	100 kHz - 1 GHz	Nov. 23, 2007	RS
Power Sensor	HP	8481D	3318A13140	100 kHz - 1 GHz	Nov. 23, 2007	RS
Power Sensor	HP	8482A	3318A26464	100 kHz - 1 GHz	Nov. 23, 2007	RS
Attenuator	HP	8491A	53603	100 kHz - 1 GHz	Nov. 22, 2007	RS
Field Strength Monitoring Antennas (Probe)	AR	FP3000A	16077	0.1 MHz - 1 GHz	Oct. 26, 2007	RS
EFT Generator	EMC -PARTNER	TRANSIENT -2000	TRA2000-376	0 kV - 4.4 kV	May 10, 2007	EFT
EFT/Clamp	EMC -PARTNER	CH4242	CNEFT1000-200	0 kV - 1 kV	N/A	EFT
SURGE Generator	EMC -PARTNER	TRANSIENT -2000	TRA2000-376	0 kV - 6 kV/2Ω 0 kV - 500 kV/12Ω	May 10, 2007	SURGE
Conducted Immunity Test System	FRANKONIA	CIT-10/75	1999010443	100 kHz - 266 MHz	Apr. 03, 2007	CS
Conducted Immunity Test System Amplifier	A.R	75A220	16980	15 - 230 MHz FM 1 kHz 80 % 75W	Apr. 20, 2007	CS
Coupling and Decoupling Network	FRANKONIA	CDN M3	A3003012	150 kHz - 230 MHz	Apr. 12, 2007	CS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Magnetic field Immunity Loop	FCC (KEYTEK)	F-1000-4-8-G-125A	03007	30A//CONTINUOUS 100A/2Hrs 230A/30SEC	Sep. 21, 2007	PFMF
Magnetic Generator	FCC (KEYTEK)	F-1000-4-8/9/10-L-1M	03003	30A//CONTINUOUS 100A/2Hrs 230A/30SEC	Sep. 21, 2007	PFMF
DIP Generator	EMC -PARTNER	TRANSIENT -2000	TRA2000-376	230VA/50Hz/60Hz 0%Open/5S 0%Short/5S 40%/0.10S 70%/0.01S	May 10, 2007	DIP
Harmonic/Flicker Test System	EMC PARTNER	Harmonics -1000	HAR1000-41	4000VA 16A PEAK	Nov. 22, 2006	Harmonics, Flicker

Calibration Interval of instruments listed above is one year.

17. Notice for Class A Product

This Notice is for class A product only. If the Equipment under Test is a class B product, this notice should be disregarded.

Class A ITE is a category of all other ITE which satisfies the class A ITE limits but not the class B ITE limits. Such equipment should not be restricted in its sale but the following warning shall be included in the instructions for use:

Warning

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

18. Declaration of Conformity and the CE Mark

There are three possible procedures pertaining to the declaration of conformity :

18.1. Conformity Testing and Declaration of Conformity by the Manufacturer or His Authorized Representative Established within the Community or by an Importer.

- Article 10 (1) of the EMC Directive,
- § 3 (1) no. 2a of the EMC Act.

18.2. Declaration of Conformity Issued by the Manufacturer or His Authorized Representative Established within the Community or by an Importer Following Testing of the Product and Issued of an EC certificate of conformity by a competent body.

- Article 10 (2) of the EMC Directive,
- § 3 (1) no. 2b of the EMC Act.

18.3. Declaration of Conformity Issued by the Manufacturer or His Authorized Representative Established within the Community or by an Importer Following Testing and Certification of the Product by a Notified Body.

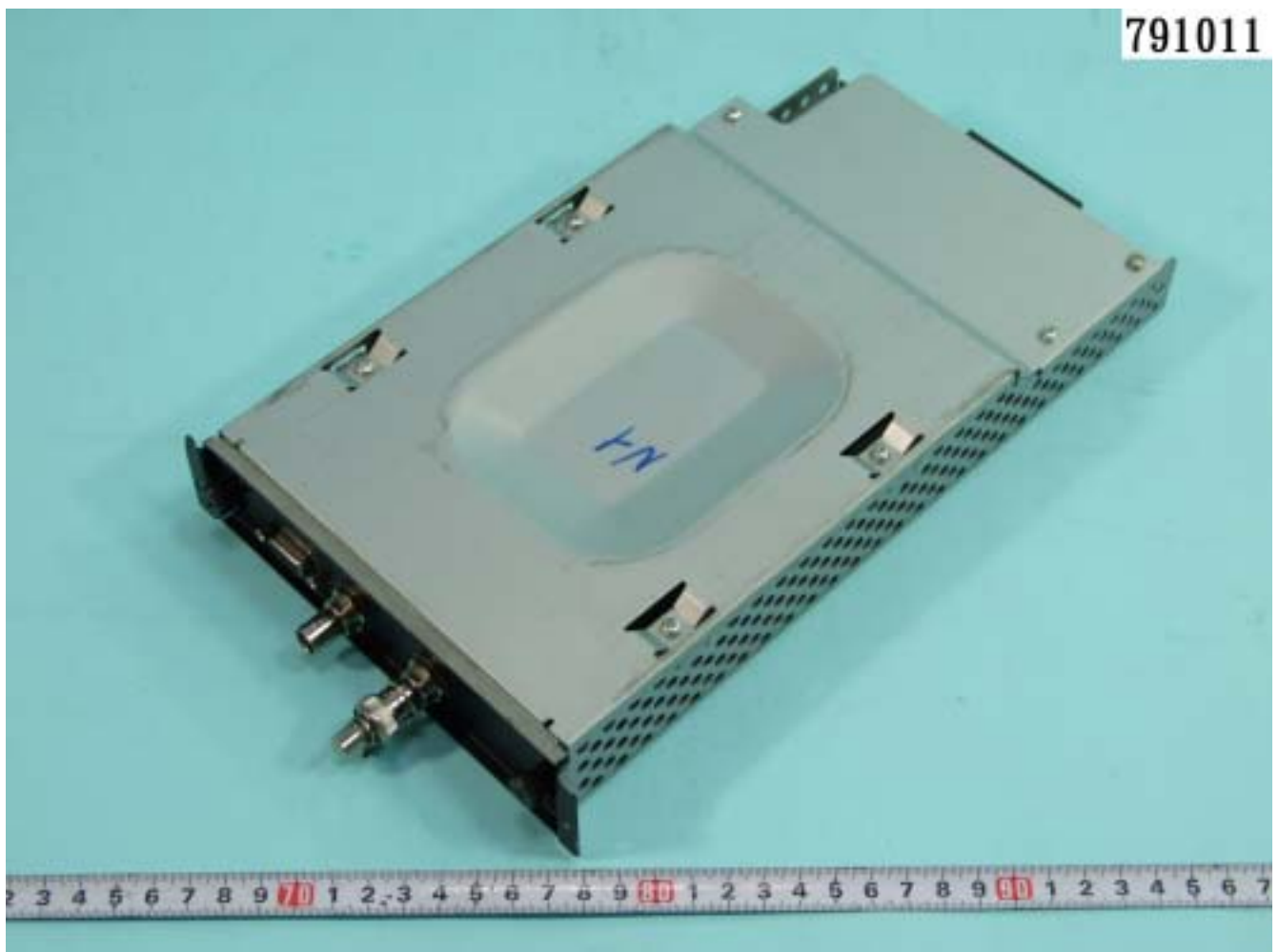
- Article 10 (5) of the EMC Directive,
- § 3 (1) no. 2b of the EMC Act (radio transmitting installations).

18.4. Specimen For The CE Marking Of Electrical / Electronical Equipment

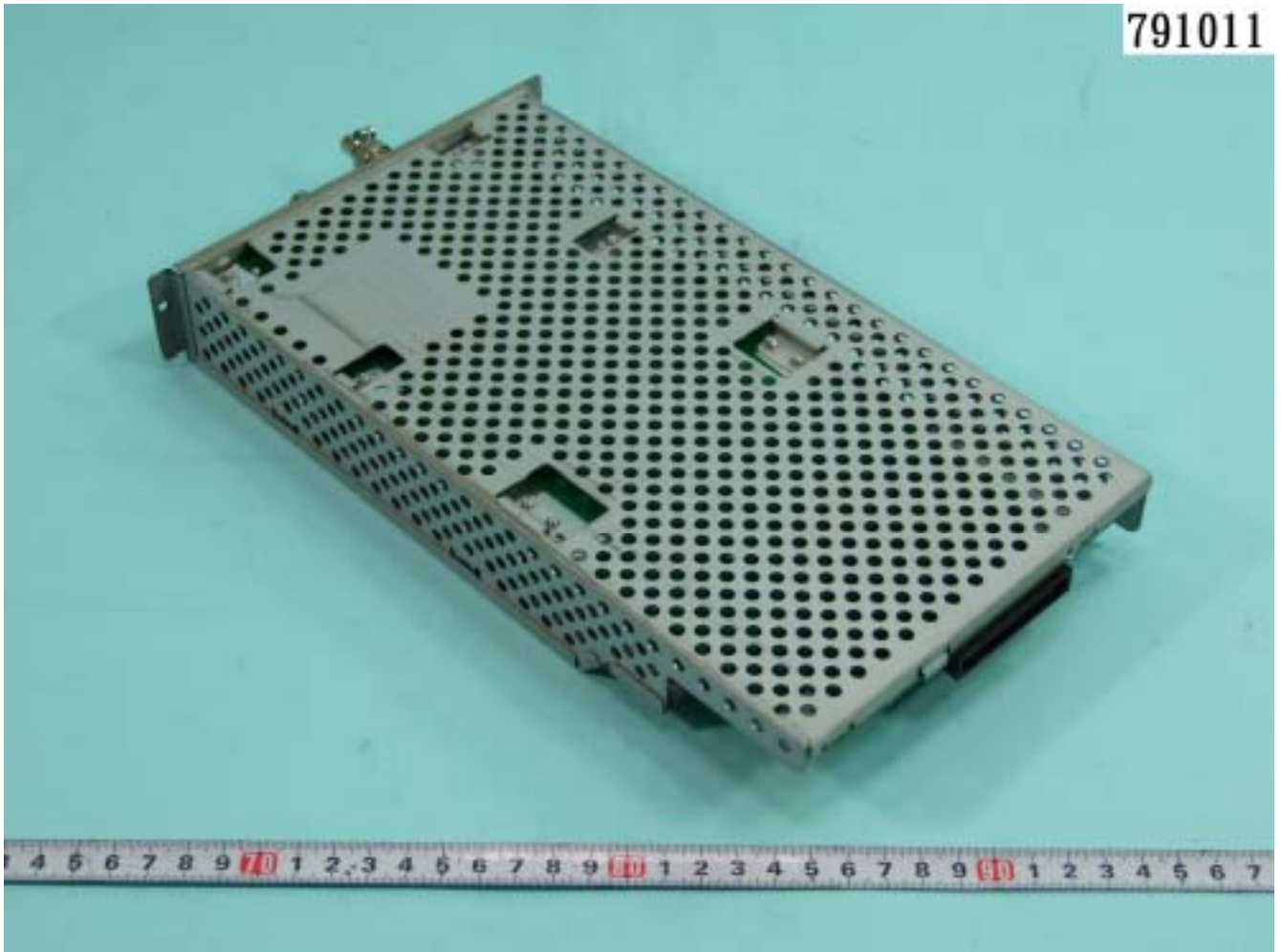
The components of the CE marking shall have substantially the same vertical dimension, which may not be less than 5 mm.



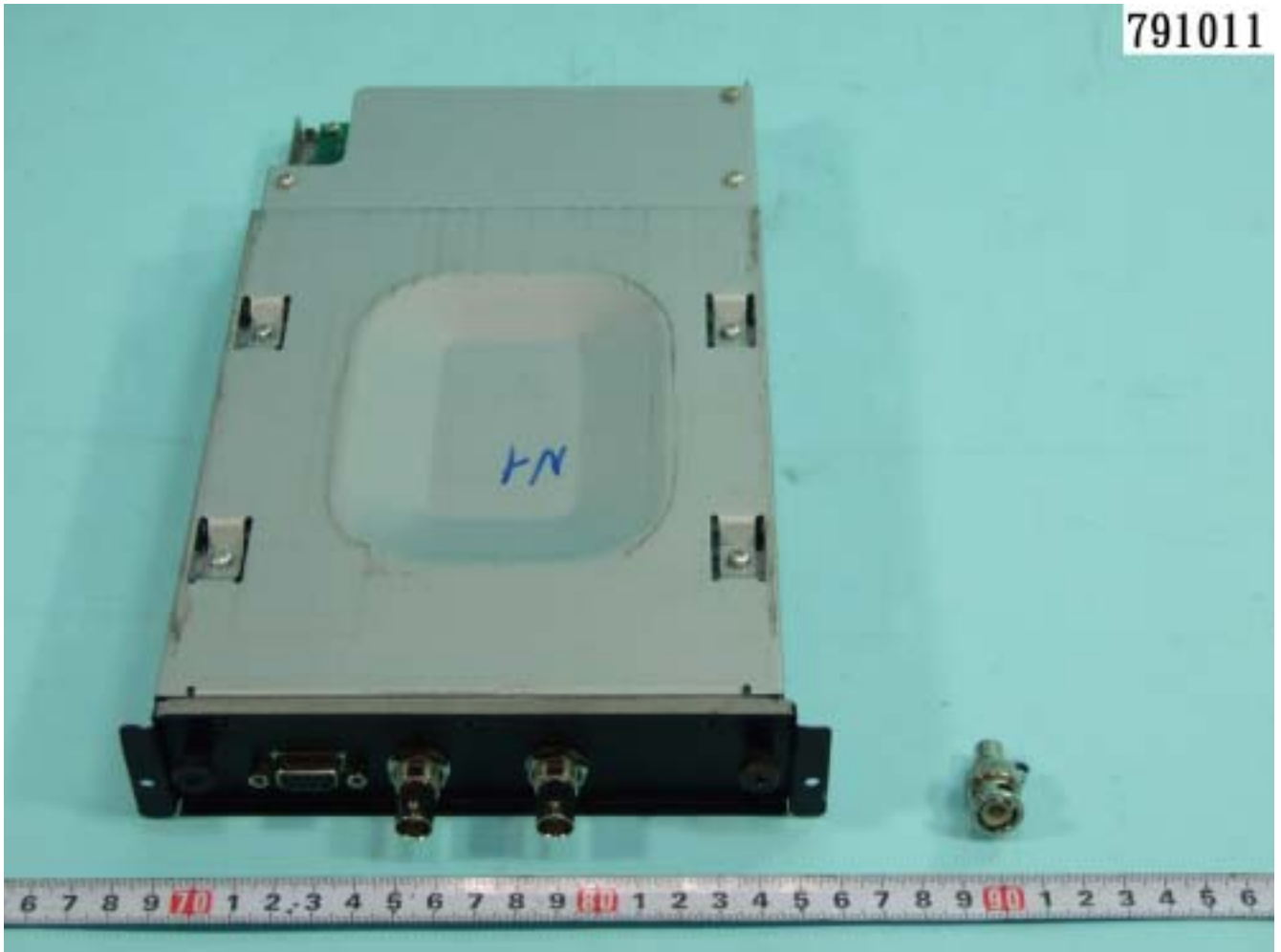
APPENDIX A. Photographs of EUT



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791011



791011



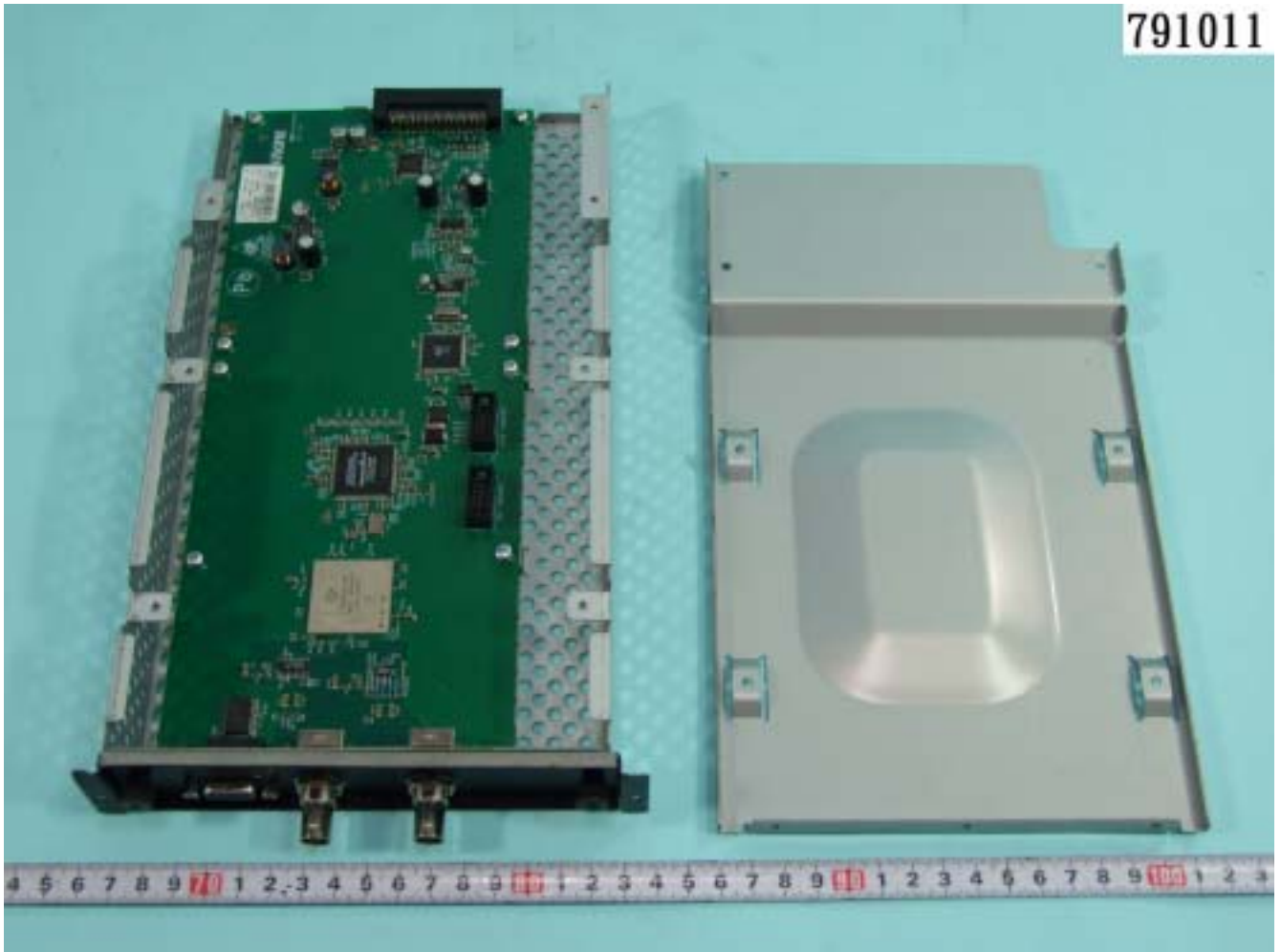
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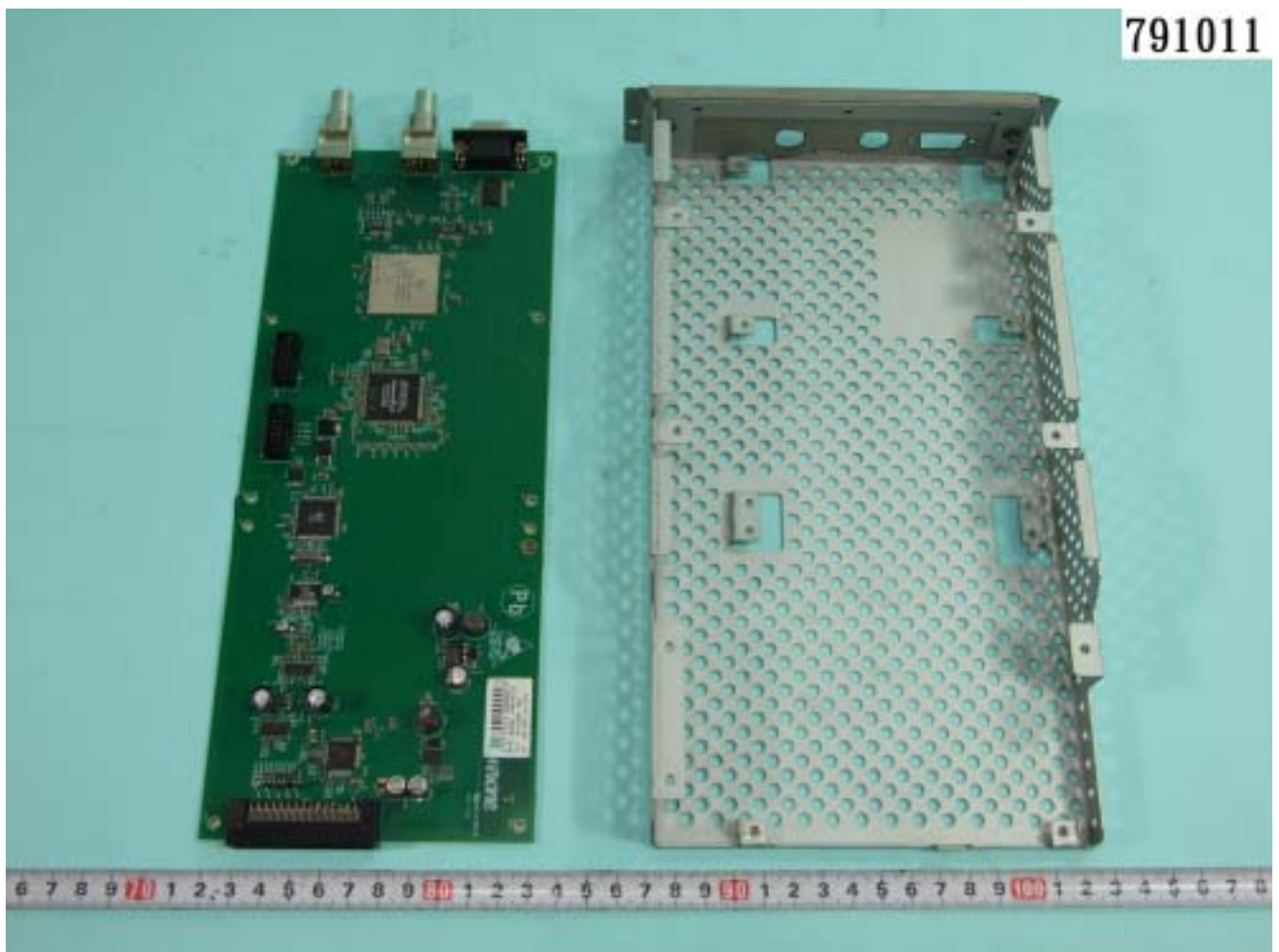


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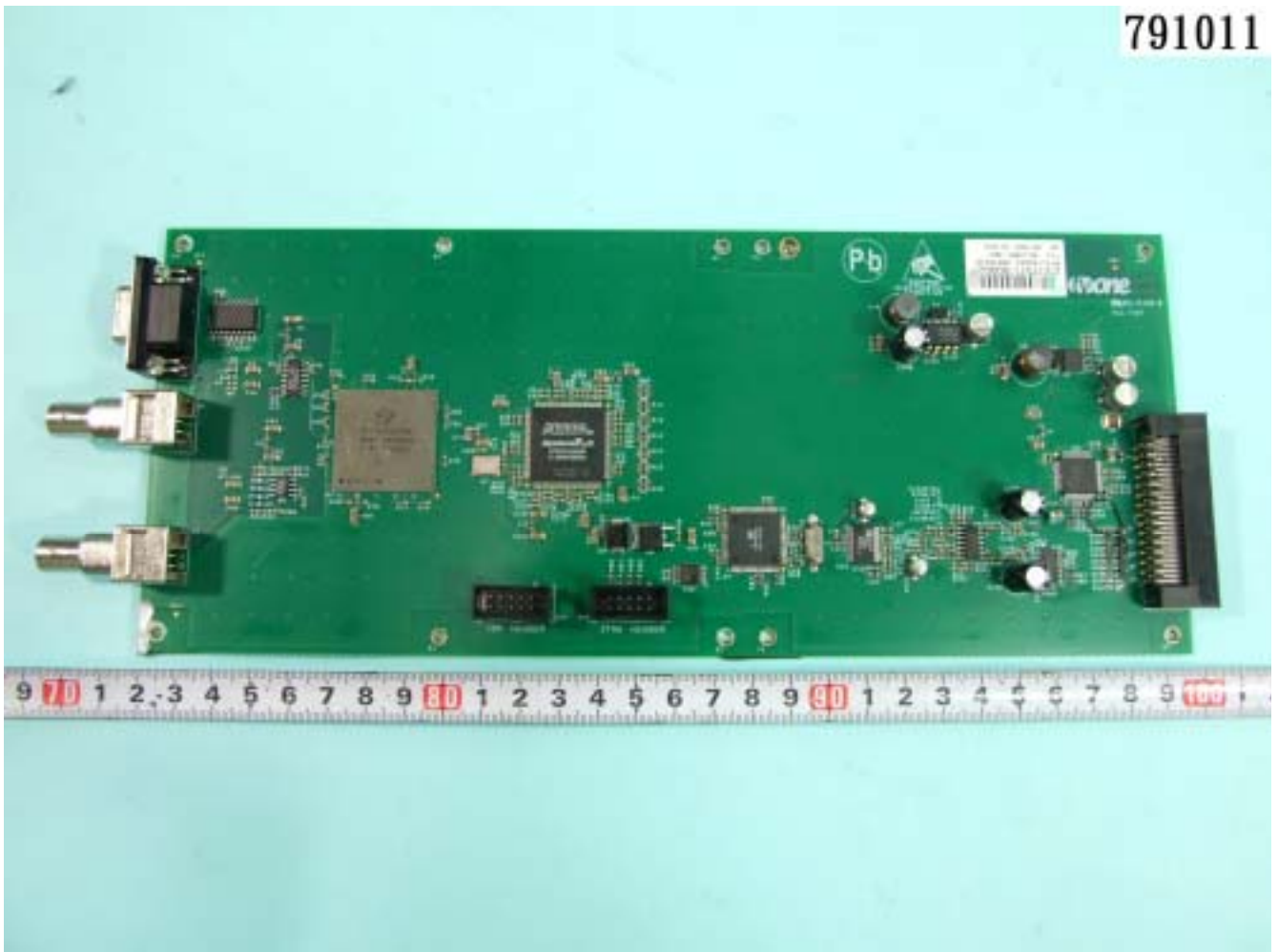


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